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UTERINE BLEEDING AND CAUSES OF UTERINE HAEMORRHAGE*

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IN practically all countries where civilization exists uterine bleeding occurs as a physiological process, and at fairly regular intervals, throughout a period of about three decades in the life of the female of the human species. Though instances of precocious bleeding in the very early years of life abound in the literature, and a few cases have been reported in which the process has been continued even as long as the ninth decade of life, these unusual occurrences are of little more than historical interest. That the function of the ovaries and of other internal secretory glands is occasionally developed prematurely is but one of the incomprehensible freaks of nature, and it should not create great surprise if in rare instances glands which usually undergo retrograde changes and lose their activity at a more or less definite period, should continue to function indefinitely.

Periodical bleeding, or menstruation, begins at an average age of fourteen to fifteen years and terminates at an average of about forty-seven. The reproductive function of the female is usually confined to the interval between these ages though not necessarily so, either in regard to the begining or the ending. It may be said, however, that unless the process is established in a manner suggesting a fairly normal state of development of the sexual organs, the power of reproduction is likely to remain in abeyance. The menstrual process must as a rule be regarded as essential and as an indication of ordinary ovarian activity and a properly functioning uterus, although this does not preclude the pregnant state before the onset of menstruation, or during periods of amenorrhoea from lactation or other causes, or after the process has apparently ceased.

To question why the female is subjected to a monthly flow of blood from the uterus is equivalent to an attempt to understand the designs of the Creator, and the many who have attempted to solve the problem by venturing opinions have left it as dark as it has always been and as it is likely to remain. To reason, however, as to its purpose, or what it is designed to accomplish, is a different matter and one concerning which an opinion may logically be expressed.

Throughout the ages much lore and superstition, sometimes mystical in the extreme, have found an origin in the occurrence of monthly bleeding. Before anything was learned of the physiological and anatomical changes attending the process the most weird ideas prevailed in regard to it. For the most part it was looked upon as a cleansing process and the menstruating female was designated "unclean." Great variations in the use of this term were in evidence and although she was sometimes allowed to hold herself aloof from her ordinary associates she was not infrequently banned from mingling with them and at times was subjected to most discourteous treat-

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ment. Superstitions accredited her with most extraordinary powers of evil in her relation to plant, insect, animal and human life, although these attributes were sometimes favourably looked upon by those who made use of her magic power of destruction to rid their fields of insects and other pests, by having her journey through them at judiciously selected times. On the other hand menstrual blood was accorded curative powers of unbounded and inestimable value. Though not entirely, such extraordinary ideas of menstruation have been consigned to oblivion and it is regarded as a natural process occurring in the life of the female and indicating that she is, under normal conditions, capable of reproducing her kind. Amongst some races the idea of uncleanliness still prevails, though not in the obnoxious sense as formerly. Some on account of religious or other beliefs are content to remain unclean to a degree, and even amongst our own people there still exists the absurd idea that throughout the menstrual period a bath of even moderate temperature should not be taken, it being admitted that one of immoderate heat or cold might be detrimental.

With advance in knowledge of the physiological and anatomical changes occurring during the menstrual cycle, the process has come to be regarded as one designed to maintain the endometrium or inner lining of the uterus in an active, healthy and suitable state to enable the uterus to perform when required its most important function in the reception, implantation and development of the fertilized ovum. As to the extent of destruction and regeneration occurring in the endometrium during menstruation, opinions have been varied. Formerly it was widely claimed that practically the whole of the endometrium was cast off and replaced by a new one, but it is now generally acknowledged that such is not the case and that the amount of actual destruction is comparatively small, although in rare cases a membranous cast may be expelled. Even this does not include the whole thickness of the endometrium. If little more than small areas of the epithelium is cast off during the monthly flow, the essential elements of the endometrium must, therefore, afterwards remain, and in practically the same proportion and relation to one another as before the flow, and yet the changes undergone by them are undoubtedly regenerative in character.

In the premenstrual stage all the endometrial elements, including the vessels, stroma cells, glands and epithelium, manifest excessive activity. They are chiefly altered in size and contour from increased vascularity with swelling and oedema and the filling of the glands with secretion. Disturbance in their proportion and relation is more apparent than real, and following the menstrual flow of blood and glandular secretion with relief of tension and lessened vascularity there is a fairly rapid return to a state existing in the resting stage of the menstrual cycle. If, therefore, it is desired to designate the purpose of the menstrual cycle by a single term, one might readily look upon it as a process of irrigation of the uterine mucosa designed to maintain it in a healthy fertile state. Its phases are apparently subject to control exercised by ovarian function and the action of the musculature of the uterus. In the entire absence of ovarian tissue it is quite exceptional for the process to be carried on.

Histological study of the ovaries has clearly demonstrated a monthly structural change in the ripening and rupture of a Graafian follicle and the development and subsequent retrogression of the corpus luteum. Such changes have a fairly definite periodicity and it has been amply demonstrated that the changes occurring in the endometrium during the menstrual cycle correspond closely in their time of incidence. The consensus of opinion is that the Graafian follicle ruptures during the resting phase and that the corpus luteum attains its highest state of development in the premenstrual state when vascular engorgement of the endometrium is most marked. That the regular periodical changes in the ovarian tissue bear a distinctly causative relation to the various phases of the menstrual cycle would appear to be well established.

Innumerable theories as to what the causative factor really is, or how it acts, have been advanced, and although much importance is attached to the corpus luteum and its probable action as an internal secretory gland, there is still a lack of definite knowledge in this matter and one cannot safely go further than to ascribe

it to ovarian activity. By some the corpus luteum is regarded as the causative factor, with its internal secretion acting directly upon the uterus through its blood supply or indirectly through its vasomotor nerves, while others venture the opinion that the action of the corpus luteum is inhibitory. This latter opinion is apparently based on the fact that retrogression of the corpus luteum of pregnancy is a slowed-up process during the attending amenorrhoea. Still others ascribe to the corpus luteum both causative and inhibitory functions. That the corpus luteum is in its highest state of development in the premenstrual stage and its retrogression begins soon after the onset of the menstrual flow would at least strongly suggest that its action is distinctly causative in respect of the flow, and that after this is well established its causative property is, under normal conditions, exhausted or withdrawn or successfully combated by the uterine muscle. There is distinct clinical evidence to proclaim the corpus luteum as a causative factor, inasmuch as the severe uterine bleeding which usually occurs in the case of an active lutein cyst of the ovary is promptly controlled by removal of the ovary containing the cyst or by complete dissection of the cyst and involved lutein body from the ovary. As to the matter of control one is much disposed to believe that this is a function that may well be assigned to the uterine muscle while cessation of the flow depends upon the exhaustion or withdrawal of the causative factor, and the controlling muscular contraction of the uterus. That menstrual blood is non-clotting is probably of little significance so far as its amount or control is concerned, but it is of vast importance in allowing easy escape of the blood from the uterus without painful contractions to expel it. Apparently its admixture with the secretion of the uterine glands maintain it in a fluid state.

During different periods of life the size of the uterus is, even under normal conditions, subject to variations and it is habitual to look upon the ordinary healthy uterus of the menstruating stage of life as being of average size. Prior to puberty the uterus is smaller and is commonly described as having a relatively longer cervix and a smaller body than the average. With the development, sexual and otherwise, taking place at puberty the uterus assumes the adult type, its body enlarging and its cervix shortening. Beyond the menopause the uterus undergoes a general diminution in size but does not return to the infantile type. This change is apparently atrophic. During pregnancy the uterus undergoes marked enlargement; following the termination of it, it returns gradually to its ordinary size or nearly so.

The blood supply of the uterus springs from a source which is abundant, coming as it does from the bilateral anastomotic circle formed by union of the ovarian branch of the abdominal aorta, and the uterine branch of the internal iliac artery. This circle is tortuous so as to permit of adequate supply to the vastly enlarged uterus of pregnancy, as well as to provide a well disseminated arterial supply throughout the uterus. It is worthy of note that the anastomotic circles run alongside the lateral borders of the uterus and that no large arterial branch penetrates its wall.

In order to give a well diffused circulation through the uterus the anastomotic circles give off numerous branches which penetrate the outer third of the uterine wall and for the most part bifurcate at the junction of the outer and middle thirds. One branch runs anteriorly and the other posteriorly at this junction and in many instances these vessels anastomose with their fellows of the opposite side. The outer third of the uterine wall is supplied mainly by branches from these vessels which tend to run in a circumferential direction. The inner two thirds of the wall are supplied by other branches which mostly run in a radial direction towards the cavity of the uterus and which terminate in the arterioles and arterial capillaries of the endometrium. The walls of these vessels are thick, elastic and resistant. Such an arrangement of the source of blood supply would appear to be an ideal one for the purpose of irrigation, its essential features being free and well diffused distribution with adequate pressure to meet the demands.

Provision for the return flow is in accord with a somewhat similar arrangement. Venous capillaries and venules are abundant in the endometrium and practically constitute an endometrial plexus. At the junction of the middle and outer thirds of the wall there is a freely communicating myometrial plexus of veins,

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while peripheral to these are various branches assuming a lateral direction towards the veins in the fibro-cellular tissue within the broad ligaments, and on through them to the uterine and ovarian veins. Connecting the endometrial plexus with the myometrial plexus are numerous veins which mostly follow a radial direction. The walls of the veins are thin, easily collapsible and are devoid of valves. Pressure within them is subject to control by the uterine muscle. This arrangement for the return flow would also appear to be ideal for the purpose of irrigation and quite adequate to meet the demands under circumstances in which a proper balance is maintained.

As an example of the maintenance of a proper balance between blood supply and its return, attention is directed to the infantile or prepuberty uterus. Being small and less contractile than later on, its supply is at all times adequate to penetrate its walls and readily reach its maturing endometrium, and the return system is not over-loaded. Under these circumstances the need of periodical irrigation does not exist and a break in the return system rarely occurs. In the pregnant uterus one of the earliest recognizable changes is softening, and as implantation of the impregnated ovum is seldom coincident with a break in the irrigation system, as a result of the continued and increasing softening of the uterine wall the adequate and increasing blood supply is taken care of by the expanding return system and a proper balance is maintained. During lactation, until such time as the uterus regains its preparous state a break in the system is unlikely, while in the rare cases of super-involution the blood supply is diminished to the actual needs of an atrophic and non-functioning uterus and a break rarely occurs. So too, in the postmenopausal uterus which is progressively atrophic a lessening supply is equal to the demand.

With the increasing development of the uterus at and after puberty, its size is increased and its firm consistency established. It is prepared for the eventuality of pregnancy. There is a need of a greater blood supply while the difficulty of thorough diffusion is increased. The distance to the endometrium from the source of supply is increased, while the uterus has acquired a greater degree of firmness and contractile power, both of which may to a degree embarrass the channels of supply in their attempt to flush the uterine mucosa and so maintain its healthy state of fertility. To accomplish this purpose, therefore, periodical irrigation is the established procedure.

In the resting stage of the menstrual cycle one often finds that in curetting the endometrium very few scrapings are obtained and there is a marked degree of firmness exhibited by the curetted wall. Scrapings examined at this time show a low degree of vascularity, and elemental inactivity. Examination of the interior of a uterus removed during the resting stage generally reveals pallor of the endometrium. Both of these findings are distinctly opposed to those in the premenstrual state. If the resting stage were to be continued indefinitely it is inevitable that the endometrium would on account of continued low vascularity become atrophic and devoid of fertility.

It is conceivable that satisfactory irrigation might be carried out and a proper balance between supply and return maintained, and undoubtedly this does happen at times, when a flow is not established, though expected. Cases are not uncommon in which all the ordinary menstrual symptoms are present except the flow. In others the flow consists of glandular discharge only. In the amenorrhoea of acute illnesses as typhoid or other infectious diseases, or following severe surgical operations or incident to climatic, nervous or other causes, the process of irrigation is not necessarily in abeyance even though there is no flow. Resulting changes in the musculature of the uterus may be responsible for maintenance of balance.

Menstruation or the monthly flow attending the menstrual cycle is the result of a break in the irrigation system of the uterus, or a loss of balance between supply and return. The loss of balance is brought about mainly by the greater embarrassment of the return system by the active musculature of the uterus. As a result of uterine contractions the thin walled veins are more affected by pressure than the arteries so that while irrigation is progressing there is engorgement of the terminal circulation in the endometrium with resultant swelling and edema of its elements. If at this stage the uterus relaxed and so relieved the pressure on the return system, a balance might

be maintained without a break. Otherwise, as usually happens, there occurs a break in the irrigation system and the tension is relieved either by actual oozing or by diapedesis or both. Although the uterus is somewhat expanded and perhaps slightly softened in the premenstrual state it cannot be said to be more than a little relaxed. If it relaxed before the flow there might not be a flow, and if it remained relaxed after the flow began this would be continued.

As previously stated the causative factor in this periodical process of irrigation is ovarian activity. Whether, or to what extent, this is influenced by the activity of other internal secretory glands is still a matter awaiting solution. Also as already stated, exhaustion or withdrawal of causative factor allows the uterine muscle to regain and maintain control. Periodical bleeding will depend upon the amount of causative factor and the ability of the uterine muscle to control, and its amount and duration will also depend upon these.

The uterus is a highly organized muscular organ with powers of contracting, relaxing and expanding, and is capable, under ordinary circumstances, of controlling the amount of blood passing through it. Normal menstruation indicates a fairly constant state of lost balance between the causative factor and the control, while an excessive flow suggests that the loss of balance is greater than the ordinary. Uterine bleeding may therefore become uterine haemorrhage when there is an excess of causative factor or when there is a deficiency or lack of control.

Each individual female is a law unto herself. The amount of her flow is generally so constant that any unusual departure is easily recognized, and in the investigation of any case in which the flow is affected it is of paramount importance to get all the information possible regarding her normal menstruation so as to judge the significance of any change. Also in respect of any alteration minute details are of great value. Excessive causative factor is due to increased or prolonged ovarian activity, although in some instances it would appear that the activity of other internal secretory glands, and notably the thyroid, has some indirect causal relation. Lack of control may be due to deficient or ineffective contraction of the uterine muscle or to abnormal relaxation or persistent relaxation after the break has occurred, or to the task of taking care of an abnormal quantity of blood during abnormally active or prolonged passive congestion of the irrigation system.

Following the onset of menstruation at puberty, it not infrequently happens that there is excessive and prolonged bleeding. In many of such cases there is concomitant enlargement and over-activity of the thyroid gland and possibly some disturbance of the pituitary and adrenal glands as well. Haemorrhage in these cases is no doubt the result of hyper-activity of the ovaries, influenced perhaps by the other glands, and the abnormality generally corrects itself in the course of a few months, and seldom calls for treatment other than constitutional and hygienic. Clinically the most notable example of excessive causative factor is the case of an active lutein cyst, already referred to above. In such a case the haemorrhage is frequently severe and is prolonged. Failure of control is also present as the uterus is abnormally relaxed. Dilatation of the uterus can be accomplished with the greatest ease. Removal of the lutein body permits of a rapid adjustment between cause and control.

Regarding the controlling power of the uterine muscle, nature affords the most splendid example in its action in child-birth immediately following the detachment and expulsion of the placenta whereby owing to muscular contraction the placental sinuses, or much enlarged uterine veins, are blocked by compression, and reflux bleeding, or post partum haemorrhage, is prevented, pending permanent closure of the veins by clotting and organization. Failure of contraction of the uterine muscle following the expulsion of the placenta leaves the break open and permits an active reflux from the valveless uterine veins and haemorrhage is inevitable. Further, in case of decidual or placental retention with only partial detachment the uterus tends to remain relaxed and the veins in the area in which separation has taken place remain unblocked, and there is reflux bleeding often amounting to haemorrhage. Efficient post partum uterine contraction precludes the occurrence of reflux bleeding, and the lochial blood and discharge are exuded from the uterine mucosa during its involution

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and until the balance between supply and return is restored and the break is sealed.

Uterine haemorrhage may be due to uterine or extra uterine causes, most of which are recognizable without any extraordinary difficulty. There are two types of haemorrhage, namely, periodical and non-periodical, the former being subject to control and the latter not.

For practical purposes one is in the habit of placing all gynaecological conditions in three groups,—first, those due to disturbed pelvic mechanics,—second, growths and tumours, and third, infections. Haemorrhage may manifest itself as a symptom in any of these groups, but the reason for its appearance is subject to considerable variation. In the first, which includes retroversion and prolapse, the uterus is frequently maintained in a state of passive congestion and there is torsion and fulness of the veins in the broad ligaments. When the break in the irrigation system occurs there is sometimes a freer unloading of the uterine vessels than is normal.

In the second group, that is, growths and tumours, excessive bleeding is generally the result of lack of muscular control either by deficient or ineffective contraction. In so-called clinical fibrosis of the uterus in which it is generally enlarged and firm and sometimes expanded, the muscle appears to be inelastic and to lack contractile power and when the break occurs an unusual degree of reflux through the radial veins is permitted. This condition is frequently associated with some chronic diseased state of the adnexa. In fibro-myomata of the uterus it is mostly due to ineffective uterine contractions owing to the fact that the anatomical relations between the tumour and the uterus are such as to deprive the muscle of its control of the radial veins and the capsular veins of the tumour, so that in the presence of a break a haemorrhagic reflux is likely to occur. Subperitoneal fibroids do not cause haemorrhage as they do not interfere with the action of the uterine muscle. Interstitial or intramural fibroids do not cause haemorrhage so long as they are surrounded by a substantial layer of uterine muscle which can exercise control over the radial and capsular veins to prevent reflux. Submucous fibroids, however, almost invariably allow menorrhagia, or excessive periodical flow to take place owing to the disappearance of muscular tissue between the tumour and the endometrium with the consequent failure of muscular control over the valveless radial and capsular veins. When a submucous fibroid becomes pedunculated its vessels are practically beyond the control of the uterine muscle, and besides the occurrence of menorrhagia there may be metrorrhagia or non-periodical bleeding as well. In a uterus which is studded with numerous small fibroids without any of them being submucous, some excess of bleeding may occur on account of general interference with muscular contraction.

Malignant disease in the body of the uterus may not affect the flow in its early stage but later on account of the increased activity in the area of mucosa affected and the development, in the growth, of vessels which are removed from the area of muscular control there may be menorrhagia. Still later owing to breaking down of the proliferating mass with inevitable involvement of vessels metrorrhagia occurs. Such bleeding due to ulcerative processes is irregular or non-periodical and not subject to muscular control. In some cases before the menopause and in all cases beyond this, metrorrhagia is the first irregularity observed. A benign polypoid condition of the endometrium may produce excessive bleeding because its newly formed vessels are beyond the control of the uterine wall, and it is indicative of localized increased vascularity.

In early uterine pregnancy, if after implantation of the fertilized ovum the uterus is sufficiently softened before the next periodical irrigation is due, the balance between supply and return is maintained and a break does not occur. If, however, implantation is late in the menstrual interval and the uterus is not sufficiently softened when the next irrigation is due a break may occur and in this way it not infrequently happens that the beginning of pregnancy antedates the last menstrual flow, although as a rule in such cases, the flow is a diminished one. In rare cases of pregnancy there is a monthly flow during the first three of four months. This would tend to indicate that some localized area of the uterus has not become sufficiently softened to permit a proper balance between supply and return, or that there is localized excess in the irrigation. In

the very exceptional case in which menstruation continues throughout pregnancy the defect fails to remedy itself.

It is noted that early uterine abortion is more likely to occur at a time corresponding to a menstrual period or closely following such. This is probably due to a break in the irrigation system at a time when there should be a proper balance between supply and return, and through a break at such a time when there is general increased vascularity, the amount of blood escaping may be so great as to disturb the attachments of the implanted ovum. The frequency of early uterine abortion at such periods and the occasional occurrence of menstruation during pregnancy provides clinical evidence of continued ovarian activity and periodical irrigations during pregnancy. The occurrence of accidental haemorrhage in the later months of pregnancy is probably due to a break in the softened channels from overloading during a process of irrigation. Bleeding in placenta previa is purely mechanical on account of blood channels being opened up by separation of a portion of the placenta from the expanding lower uterine segment.

It is a significant fact that pregnancy is normally terminated at a period which ordinarily corresponds to the resting stage following the ninth periodical irrigation. At this time the child in utero has recently assimilated its last transfusion or shower of maternal blood and the uterus is in the best condition for undertaking the work of expulsion of the child and the subsequent control of its own circulation. That separation of the child from the mother is deferred until nine months have elapsed is no doubt due to nature's wise provision for the full development of the child and its safety when assuming its separate existence. Though viability is attained earlier it is by no means as certain, and in respect to all growth nature has set a time for its various phases and the fulfilment of its purpose.

In ectopic pregnancy which in practically all cases is primarily tubal, there is usually a missed period or if not there are practically always some details regarding the menstrual history which suggest a departure from the normal, as for instance, the regular periodical flow comes on and may equal the average or be less or greater in amount and duration. Then a few days after its cessation there may be a recurrence though often differing in character. Clinical observations during many operations for ectopic pregnancy have convinced one that its softening effect upon the pelvic organs is almost as great in a general way as early uterine pregnancy and that in respect to the involved adnexa and the tissues bearing them it is much greater. The pregnancy constitutes a centre of an area of markedly increased vascularity. This local increase has the effect of attracting blood away from the irrigation system of the uterus while at the same time the uterus is softening. Therefore in many instances when the ensuing periodical irrigation of the uterus takes place a balance between supply and return may be maintained without a break, while in other earlier instances where less of the supply is attracted from the uterus and easier return is not yet established, the usual break occurs.

Haemorrhage is a symptom frequently observed in ectopic pregnancy, but as a rule is not severe. It is irregular and small in amount and the blood is usually darker and more brownish in color differing from fresh blood from the uterus. In most cases it is a flow from the affected tube through the uterus and indicates that haemorrhage is going on in the region of the ovum. When more recent in appearance and larger in amount it tends to indicate a break in the endometrial channels on account of excessive engorgement and overactivity of the mucosal elements. One's own observations lead one to believe that the formation of a decidua is uncommon. Certainly the expulsion of a decidual cast is a rare event. In only one of the writer's cases has such a cast been observed and that was expelled after operation. The finding of decidual-like cells in curettings from the uterus while tubal pregnancy exists by no means indicates the formation of a decidua. Their presence is significant of marked activity of the stroma cells.

Pathological conditions of the cervix of the uterus may and frequently do, give rise to haemorrhage, and as the tissue involved is beyond the control of the uterine muscle, such bleeding will usually be non-periodical, although in some conditions as catarrh or cervical polypus it may be coincident only with the menstrual period with a tendency to prolong-

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ation and to occasional intermittent activity. By far the most important disease of the cervix is cancer and its earliest symptom is bleeding. At first it is almost insignificant in amount, and when free it generally indicates a fairly advanced state of disease. As in cancer of the body it is due to the breaking down process following some proliferation, and not being subject to uterine control, it is of necessity irregular. As compared with cancer of the body, haemorrhage, as a symptom, occurs somewhat earlier on account of earlier added infection from the vagina tending to hurry the ulcerative process.

Twisting of the pedicle of an ovarian tumour may cause mild uterine bleeding, and as this has been observed in at least two of one's cases in women several years past the menopause as well as in a few cases prior to the menopause, it is concluded that the break is a direct effect of back pressure in the return channels on the affected side by reason of the torsion involving the veins of the broad ligament.

In infections, or conditions in our third group, there may be excessive flow at the menstrual period and not infrequently the occurrence of the flow is precipitated. Both may be the result of active congestion attending the inflammatory process resulting from the infection. Active over-engorgement of the vascular channels causes a greater loss when the break occurs, while on account of the overloading, the break occurs earlier than under an ordinary load. Hence, in cases in which there is a sudden precipitation of the flow with excess in amount the possibility of infection should always be considered. If added to these there is pain, a symptom so commonly produced by active vascular engorgement, infection is even more strongly suggested. Besides having a direct causal relation to increased bleeding in this manner, infection may act indirectly. By the continual involvement of the adnexa with increased congestion the ovaries may temporarily manifest over-activity with a consequent excessive production of the causative factor. That this event may assume even extreme proportions is evidenced clinically by the occasional occurrence of rapid haemorrhagic cystic degeneration of one or both ovaries in the presence of infection either local or general with associated and free uterine haemorrhage. A case of this kind occurred in the writer's experience in a patient suffering from a severe attack of influenza. Infection may also act upon the wall of the uterus with resulting diminution of its contractile power and ability to control.

The addition of infection to such conditions in group No. 1, or 2, as may be complicated by infection will naturally tend to increased vascularity with consequent increase in haemorrhage as a symptom, and may even induce haemorrhage where previously it was absent. In cancer, as stated above, added infection induces earlier and increased bleeding. Infection of a fibroid tumour of the uterus gives it greater power as a cause of bleeding, and fibroids which may not be active in this way may have their activity much increased by infection.

Notable in this regard is the process of necrobiosis or red degeneration of a fibroid, a transformation which one believes is always the result of infection, either local or general. Most of such cases occur shortly after childbirth or abortion, and their clinical course would certainly suggest an infective cause. One has seen in a woman of twenty-five, recently confined, a large submucous fibroid degenerate, break down and become expelled through the cervix. Infection was obvious although localized in the tumour area.

Two of the most typical cases of acute red degeneration of a fibroid tumour coming under one's care were seen in the convalescent stage of severe influenza. One of these was in a woman who was approaching the menopause and had not been pregnant for over ten years, and the other in a woman of fifty-four who though having had excessive bleeding at her periods some time previously ceased to menstruate, and during her influenza had a severe recurrence of bleeding which continued until she was relieved by hysterectomy. Other types of degeneration so prone to occur in fibroid tumours especially about the time of the menopause usually tend to an increase of haemorrhage. It is quite possible that in many such cases infection of unrecognized origin may be the cause, although in many others inadequacy of vascular supply is the responsible feature.

In occasional cases in which the menstrual

flow is scanty or absent there occurs a periodical flow of blood from other and remote mucous membranes, and more commonly from the nose. Also is some cases even with a normal menstrual flow there is vicarious menstruation. The rationale of this procedure is difficult to determine and can only be assigned in an indefinite way to some abnormal activity of the internal secretory glands. In the case of a young girl of eighteen seen in consultation recently, since the onset of her menstruation about two years previously, she had monthly and often profuse nose bleeding just prior to the appearance of the monthly flow. She lost much blood and became very weak. At the time of consultation she was bleeding profusely from the nose and her menstrual period was almost due. Her pulse was thready and its rate about 150. She was absolutely blanched and her breathing was very difficult. It was possible to check the nasal haemorrhage and transfusion would have been performed had she not died in a few hours, before it could possibly be arranged. It is doubtful, however, whether this would have been of any benefit in such an extreme and dying condition.

A young girl was recently admitted to the Gynaecological Service at the Toronto General Hospital menstruating for the first time and in such a state of exsanguination that all efforts to save her life were unavailing. In a case of this kind which is fortunately very rare, there is a complete loss of balance between causative factor and control, the latter being entirely in abeyance allowing a continued reflux from the vascular channels in a manner analogous to post partum haemorrhage. This and some other cases of less severity, even from other causes, may be regarded as post menstrual haemorrhage.

The haemophilic diathesis may in these rare cases of severe or vicarious menstruation have an important bearing, but in respect of uterine bleeding, loss of control is an essential feature.

Various general disturbances and particularly of a nervous character may influence the amount of the menstrual flow and may even alter its periodicity. Their influence must be exerted through the internal secretory glands, the ovaries acting as the medium and at the same time affecting the neuro-muscular mechanism of the uterus. Like other problems, however, suggesting disordered activity of the internal secretory glands, their explanation is difficult or even impossible.

Visceral disease involving the heart, kidneys or liver is sometimes attended by disturbance of the menstrual flow, while in women past the menopause a not uncommon cause of irregular uterine bleeding is high blood pressure. The uterus is generally atrophic and its inner vascular channels are in a weakened, exposed and preapoplectic state. In such cases as this bleeding may be beneficial and one has commonly had the patient express a feeling of improvement after its occurrence. It is of course most important to rule out the possibility of malignant disease as it is in any other case of irregular, uncontrolled non-periodical bleeding. In fact in the presence of this important symptom, it is a good rule to regard the condition as malignant until it can be decided after thorough investigation that it is or is not. Every possible doubt should be reduced to the minimum.

It has been noted that in the presence of fibroid tumours and also in some other diseased conditions of the pelvic organs, the menopause is delayed. If this is so, it can only be through prolongation of ovarian activity and it is difficult to understand why this should happen any more frequently because of the presence of disease than it does under more normal conditions. It is more than likely that it does not, as there is probably as great a proportion of women with a delayed menopause who, not having disease with attending symptoms, do not come under observation. It is perhaps more authentic and worthy of note that many women with gross pathological conditions involving their pelvic organs do not suffer any excess or prolongation of the menstrual flow. This would indicate that even in the presence of gross disease a proper balance between supply and control may be maintained.

As one's clinical experience enlarges one is more convinced that the uterine muscle has and does perform a most important function in the control of the blood passing through its vascular channels. The whole mechanism of the uterus is intricate and extraordinary in its completeness, and from a clinical point of view the writer believes that the observations contained in the foregoing paragraphs, and which are

mainly founded on opinions gradually developed out of one's practical work, afford at least an idea of the subject of uterine bleeding and the causes of uterine haemorrhage which is distinctly applicable in the daily routine of gynaecological practice.

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ALTHOUGH a formidable mass of literature has been accumulated on the subject, even so far as to make it appear hackneyed, I doubt if uterine bleeding is generally estimated seriously enough. In the voluminous literature the vital matter, which is the treatment and relief of the suffering patient, is often so buried under reiteration and discourse on etiology and theory that it is difficult for the busy practitioner to find the practical help he seeks. But the treatment of uterine haemorrhage is constantly improving, however unsolved the obscure points of etiology remain.

The object of this paper is primarily to urge an increased vigilance in the presence of this common symptom of a serious gynaecological condition, to emphasize the necessity for skilful differentiation in diagnosing its origin, and to caution the too sanguine or hasty diagnostician when proceeding to treatment. Uterine haemorrhage is only a symptom, but in many cases it is the first and sometimes the only symptom, as you all know, which attracts attention to a grave condition. It is a symptom which always demands treatment. Let me impress on you that it is a symptom which arises from so great a variety of pathological derangements, that every medical man should make himself as familiar as possible with its causes.

It is not intended here to cover the treatment of uterine haemorrhage associated with pregnancy or general conditions, but to make a comprehensive classification it is necessary to include all the causes associated therewith. To present them in a convenient form, the various causes may be listed in three main groups.

(A) Constitutional causes.
(B) Those associated with pregnancy.
(C)) Local causes.

(A) Under constitutional causes may be mentioned:—(1) Syphilis, (2) hemophilia, (3) anaemia, especially pernicious anaemia, (4) phthisis, (5) hyperthyroidism, (6) scurvy, (7) rheumatic diathesis, (8) infectious diseases, (9) cardiac disease, and (10) hepatic disease.

Such bleeding naturally comes under the care of the physician rather than the gynaecologist. The cause of the haemorrhage is usually evident from the general condition of the patient, and it is seldom that the bleeding requires special attention.

(B) Under the second group we may mention:—(1) Threatened or incomplete abortion, (2) extrauterine pregnancy, (3) pregnancy in one horn of a bicornuate uterus, (4) vesicular mole, (5) Choriocarcinoma, (6) accidental haemorrhage, (7) placenta previa, (8) retained secundines, (9) sub-involution. These conditions usually require very prompt and accurate diagnosis and often surgical interference. If they were mistaken for some of the conditions which are enumerated later, they would undoubtedly result fatally. It is essential, therefore, that anyone treating uterine haemorrhage should not only be familiar with obstetrical conditions, but should be able to deal with them efficiently—surgically if necessary. On the other hand, one must never forget that

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many conditions which cause uterine bleeding may be complicated by pregnancy, and the pregnancy not be suspected because of the bleeding.

(C) Coming now to the third group of cases due to local causes, one finds that there are many conditions which are difficult to classify, but the following enumeration will fairly well cover the subject, at least for the illustration of the cases I wish particularly to discuss, namely, those most suitable for treatment by radium. (1) Carcinoma of the uterus, (2) sarcoma of the uterus, (3) retro-displacements, (4) tuberculous endometritis, (5) senile vaginitis and endocervicitis, (6) disease of the adnexa, (7) fibrosis uteri, (8) hyperplastic glandular endometritis, (9) leiomyomata.

In all these local conditions medicines are practically valueless. The treatment required is some form of surgery or radiation.

(1 and 2) In malignant disease of the cervix or body of the uterus, the first symptom which brings the patient to the physician is almost always uterine bleeding. If these cases are seen and recognized as soon as the bleeding begins, they can usually be cured, for in the early stages they are local diseases. If the bleeding is not considered of serious import, and temporary measures are adopted or any form of treatment is instituted other than that which aims at complete eradication, the case soon becomes hopeless. Frequently it is necessary to do a biopsy and, in fact, in practically all cases of possible malignancy careful examination under an anaesthetic and a diagnostic curettage ought to be compulsory.

There is no unanimity of opinion as to the best method of treatment, but I, personally, do not believe that in this condition the use of radium or x-ray, alone or in combination, has yet been justified. The results from the two-stage operation of cautery followed by panhysterectomy, are still, for me, a surer method of eradicating the disease; nor do my results warrant me in radiating either before or after radical operation; nor do radium or x-ray in *inoperable* cases give better results than the cautery. The cautery has fallen into disfavour because its difficult technique has not been studied. All that one can hope to accomplish with either the cautery or radium, is the destruction of the local growth. With the careful use of the cautery one can destroy as much as one wishes, whereas with radium and x-ray this is very difficult to regulate. The pain and discomfort after cauterization is, if anything, less than the pain and vomiting which is often occasioned by radium and x-ray. The Paquelin cautery is absolutely useless in these conditions; nor is the Percy method of cauterization, as generally understood, to be recommended. A heavy electric cautery similar to or of the Percy type, used through a water-cooled speculum, is required, and the cauterization must be done to the limit of danger as regards fistulae.

These conclusions are based on my experience in 64 cases, which are not selected but include every case of malignancy seen in my practice in Toronto up to January, 1918. There was a definite pathological diagnosis in each instance and they were all treated by the cautery or operation, or a combination of these methods. Of the 64 there are 18 living and well, five years or more after treatment. These results are vastly superior to those of later years when I was employing radium or x-ray, and until the advocates of radiation can demonstrate a definite technique of application and dosage giving better results, the two-stage operation is the one of choice.

(3) Retro-displacement of the uterus is not always an operative condition, but if abnormal bleeding is one of the prominent symptoms, it is wiser to deal with this symptom surgically than to use radium or x-ray, owing to the frequent association of tubal inflammation.

(4) Tuberculous endometritis. With our present knowledge, radium and x-ray should not be used in these cases, as tuberculosis of the adnexa is often also present; the condition is a surgical one, and at the time of operation the tubes and ovaries are dealt with as required.

(5) Senile vaginitis and endocervicitis are usually found in old women, where there is a tendency for the mucous membrane to bleed. They can be cleared up more easily and effectively with the Paquelin cautery than with radium or x-ray.

(6) Disease of the adnexa is an absolute contra-indication to the use of radium and x-ray. It is in this class that the injudicious use of these agents causes most trouble. There-

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fore, because inflammation of the tubes and ovaries frequently accompanies so many other conditions, *e.g.*, leiomyomata, fibrosis uteri, etc., I am convinced that neither radium nor x-ray should ever be applied in any circumstance without careful examination both without and with anaesthesia.

(7) Fibrosis uteri is a clinical term rather than a pathological entity. The majority of cases of fibrosis uteri are of the sub-involution type, with both the muscular and fibrous tissue increased. The blood vessels are thick-walled and there is considerable perivascular infiltration and increase in elastic tissue. Besides this large, hard type of uterus, there are the small, sclerotic uterus and the large, soft, flabby uterus which bleed abnormally. Sometimes we may find such a uterus in which there has been no abnormal bleeding, consequently the histological findings in cases of fibrosis uteri are not of paramount importance. The most constant finding is a glandular hyperplasia, in which there is a marked increase in typical glands. In this group must also be considered the cases of so-called idiopathic haemorrhage, which show no pathological change and which are theoretically explained as caused by some disorder in function of the endocrine glands. Whether this be true, or whether the bleeding is caused by the changes in the myometrium and blood vessels, treatment must be directed against the bleeding uterus, and radium is the method of choice. Although we might theoretically hope for some benefit from the administration of the extract of various glands, it has been useless in my experience. Examination under anaesthesia and a diagnostic curettage should always be done, and, in absence of contra-indications, radium introduced into the uterus at once. Dosage varies from 200 mgm. hours to 1500 mgm. hours, depending upon the size of the uterus and whether it is desirable to produce an artificial menopause, and with properly estimated dosage one treatment is sufficient.

(8) Hyperplastic glandular endometritis and polypus are the same pathological condition, one being diffuse and the other focal. The glands are increased in number, lined with a single layer of epithelium, and there is no invasion of the muscularis and no mitosis. Bleeding from such a condition can be relieved for several months by curettage, but the condition tends to recur. The uterus may not be enlarged but usually is. These are the cases which were formerly subjected to repeated curettements, but are much more efficiently treated by radium, taking into consideration, of course, the absence of contra-indications and the age of the patient as to dosage.

(9) Leiomyomata. This is a much better term than fibroid: it includes tumours in the uterus arising from unstriped muscle. The stroma of these growths is composed of fibrous tissue and represents the reaction to the invading tumour cell. They are, therefore, of varied consistency, being soft if there is a predominance of unstriped muscle, and very hard if there is a predominance of stroma or fibrous tissue. They may occur in any part of the fundus or cervix, may be large or small, or may be extruded from the uterine wall and become pedunculated either as subperitoneal or intrauterine fibroids. They are subject to various degenerations, and the situation and condition of the tumour or tumours must be determined before any form of treatment is decided upon. It is in the choice of treatment of leiomyomata that controversy is apt to arise. The operations of complete and subtotal hysterectomy have been brought to such a high degree of technical perfection, that it is difficult to persuade skilled operators that any other form of treatment is applicable. On the other hand, the results of treatment by radium and x-ray are now so well established, and the results often so brilliant, that the devotees of radiation are apt to be over-enthusiastic. But neither the surgeon nor the radiologist should have too narrow a point of view. With our present crystallized knowledge from experience and observation, it ought not to be difficult to lay down certain definite principles upon which we can agree. Even if one is practically certain of the successful termination of a hysterectomy, one must regret the necessity of a serious, painful operation.

It has been shown that the most constant effect produced by radium is a marked change in the intima of the blood vessels, the end result being similar to an endarteritis obliterans. Since the x-ray and radium have been used extensively, it has been shown that both radium and x-ray affect the ovaries, producing

changes in the superficial cells. However, the cessation of bleeding is not entirely due to the change in the ovaries, as is proven by the fact that uterine bleeding occasionally occurs after removal of both ovaries. It is often seen that haemorrhage occurs after the menopause. Both radium and x-ray have a specific effect on fibrous tissue, for either will successfully remove keloids.

A definite principle which I have established for myself in treating uterine haemorrhage, is that radium is the treatment of choice in idiopathic haemorrhage, fibrosis uteri and hyperplastic glandular endometritis. The dosage must be carefully regulated according to the age of the patient. Full dosage will always produce artificial menopause. Radium is also indicated in leiomyomata not larger than a 3½ months pregnant uterus in women over forty years of age. For young patients, a myomectomy is to be preferred; if a hysterectomy must be done, one or both ovaries can be left. Radium is further indicated in poor surgical risks, those suffering from cardiac, renal or tuberculous disease, those profoundly anaemic, and very fat women. Large, pedunculated, subserous or submucous leiomyomata, suppurating, necrotic or gangrenous tumours and those showing cystic or calcareous degeneration, leiomyomata complicated by ovarian tumours or tubal inflammations and tumours producing marked pressure symptoms, must be dealt with surgically.

If radium can be used at all it should be preferred because of its safety. There is practically no mortality and there should be no morbidity in carefully selected cases. The patient is relieved of mental and physical suffering occasioned by an operation, less anaesthesia is required, there is an economic saving in hospital charges and special nurses and time saved for the individual patient. Sufficient cases have now been under observation to show that a tumour will shrink after the use of radium, and that if a proper dosage is given, haemorrhage will be checked. We have yet to see the case where after using radium, there has been no shrinkage of the tumour. Unfortunate results due to improper dosage and improper screening should not occur. Even the leucorrhea, so often reported at first as a sequela of radium treatment, is now unknown. The possession of an alternative resource is a great boon. A myomectomy, for example, may now be ventured more confidently than formerly, because, if haemorrhage does recur, it can be checked by radiation; or, if one uses radium in the first place in a selected case and it proves unsatisfactory, surgical treatment can still be tried.

Radium in gynaecology is to be preferred to x-ray, in the first place because it can be more directly applied, in the second place because its action on the ovaries can be more certainly controlled than can the x-ray. The fundamental fact that both radium and x-ray decrease in their action inversely as the square of the distance makes these statements self-evident. The ovaries are less liable to damage from the ray when it is projected directly from within the uterus than when it is projected from an x-ray tube outside the body and about equi-distant from them and the uterus. X-ray technicians believe they can screen the ovaries, but the exact position of the ovaries can often not be positively demonstrated even by examination under anaesthesia. We find that when a cessation of menstruation has been temporarily produced by radiation, the function returns more quickly after radium than after x-ray application. An examination under anaesthesia is required in either case to rule out conditions where neither should be used. If there is no contra-indication to radiation, a further advantage of radium is that it can be inserted in the uterus at once, and in practically all cases only one treatment is necessary; with x-ray repeated treatments are generally used. Indeed, although insisting on its circumscribed sphere in gynaecology, I believe radium to be so indispensable an agent, as to have become as necessary to the gynaecologist as a cautery or a scalpel.

My technique is to screen the radium needles in their brass container and then in black or gray rubber tubing. It is placed accurately in the uterus and held securely in position by a catgut suture through the cervix and the rubber tubing. A full length catgut suture is used and tied by a slip knot which can be easily loosened when the radium is to be removed. 1,200 to 1,500 mgm. hours will produce an artificial menopause. If menstruation is not to be stopped completely, 150 to 600 mgm.

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hours, according to the size of the uterus and the age of the patient, is the dosage.

In almost 40% of the cases on which I would formerly have operated, probably doing hysterectomies, I now use radium. The remaining 60%, however, still require surgery. Radium, x-ray and surgery are not competing; they are not antagonistic; we should determine what is best in a given case and must be careful not to generalize too much.

Conclusions. 1.—The importance of impressing upon both the public and the profession that any abnormal uterine bleeding requires most careful investigation as soon as it appears.

2.—The application of radium or x-ray in gynaecological cases should be under the supervision or be conducted on the advice of a physician or surgeon skilled in gynaecological examination and diagnosis.

3.—The decision as to the choice of treatment should not rest with the radiologist unless he is specially trained in gynaecological diagnosis.

4.—It should be an axiom that radium or x-ray should not be used until an examination under anaesthesia has been made, and if necessary, a diagnostic curettage or biopsy done.

5.—Neither the surgeon nor the radiologist should have only one point of view.

6.—The use of radium is contra-indicated in cases of (1) inflammatory lesions of the tubes or ovaries; (2) leiomyomata larger than a 3½ months pregnant uterus; (3) large, pedunculated, subserous or submucous leiomyomata; (4) leiomyomata showing any form of degenerative change; (5) leiomyomata complicated by ovarian tumours; (6) leiomyomata producing marked pressure symptoms.

7.—Radium should be used with great care in young patients in whom it is desired to retain active menstrual functions.

8.—Radium is the treatment of choice in (1) leiomyomata not larger than a 3½ month pregnant uterus in women over 40 years of age, (2) fibrosis uteri, (3) hyperplastic glandular endometritis, (4) polypi, (5) patients who are poor surgical risks.

9.—Dosage—depends upon (1) the size of the uterus, (2) the age of the patient, (3) whether the function of child bearing is to be preserved or sacrificed.

10.—Complications and unfavourable results are to be avoided only by a careful, discriminating, differential diagnosis.

Epidemiology of Colds in Infants.—Five hundred cases of colds were studied by Walter Fritz Winholt and Edwin Oakes Jordan, Chicago. There was a distinct history of a cold in some member of the family in 290 of the 500 families in which a baby had a cold, but in only 180 of the families to which the normal babies of the control series belonged. That is, 58 per. cent. of the babies having colds at the time they were brought to the infant welfare stations had presumably been more or less in contact with other cases of cold in their respective families, while only 36 per cent. of those without colds had been subject to similar contact. Figures given seem to indicate that in families in which there are babies with colds there is much more likely to be a history of cold in the mother than in families in which the babies are free from colds, but that the occurrence of a cold in the father is not manifestly related to a cold in the baby. In families in which members other than the mother or father, presumably in most cases other children, have colds, babies with colds are somewhat more numerous than babies without colds. The relatively close and prolonged association of mother and baby may account for the observed differences. So far as these facts go, they distinctly favour the view that at least some types of common cold are due to contact infection. The incubation period of colds is probably very short. Nearly all the babies' colds which were contracted after exposure within the family showed symptoms before the preceding patient's cold has disappeared. Coincident ailments, indicating lowered resistance, especially those of deranged metabolism, were much more common in babies with colds than in those without colds.—*Jour. Amer. Med. Ass.*, July 28, 1923.

UTERINE CURETTAGE: ITS MULTIPLE CONTRAINDICATIONS AND LIMITED INDICATIONS*

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UTERINE curettage is one of the most frequently performed surgical interventions by the general practitioner. Let us right away say that no operation is more responsible for so many complications and so frequently the cause of a further aggravation of the woman's condition.

It is a matter of regret for the sake of suffering womankind that so few general practitioners are aware of the underlying pathological conditions which are absolute contra-indications to curettage in many cases of pelvic disease.

During more than 20 years of hospital connection with consequent consultations, so many complications arising out of these curettages have been brought to our attention, that it will not be out of place at the present time to discuss the conditions under which curettage must not be done and those in which it will be beneficial.

The general practitioner is a busy man. Overtaken with day and night work, little time is left him for the study of pathology during the years of his active practice. So a careful statement to-day, of the many contra-indications to the employment of uterine curettage may tend to the welfare of our female patients who deserve, in addition to our sympathy, our best of care.

Firstly, will a patient suffering from a chronic yellow or greenish discharge, sacral pains and distressful menstruation accompanied with dyspepsia, constipation and headache—in fact from the symptoms of a chronic metritis, will such a patient be cured or improved by curettage? No; curettage can do no good. (1) Because this chronic metritis is caused in the majority of cases by infectious germs; gonococci most frequently, streptococci, and staphylococci next, rarely by the Koch bacilli; all of which have with time penetrated further than the uterine mucosa, and deeply into the uterine muscle through the lymphatic spaces. (2) Because such a condition is usually aggravated by a malposition of the corpus uteri which very frequently lies low in retroposition. (3) Because it is usually accompanied by a chronic salpingitis, the result of the infection having extended to the Fallopian tubes. And thus is it not easily understandable that (A) the curetting cannot destroy the deeply seated infection in the uterine muscle; (B) cannot remedy the malposition; (C) cannot attempt to cure the accompanying salpingitis.

Not only can it not do it, but it usually aggravates the condition of the patient, because the traumatism it causes reawakens the slumbering infection and stimulates it.

Secondly, in the dysmenorrhea of the virgin or, more precisely, of the non-infected woman is it of help? It can be of little help, because with these patients the cause or multiple causes of their ailings arise from a simple stenosis of the cervix, with an acute flexion of the organ, and an underlying nervous systemic state. Only if the patient suffers from a so-called "membranous dysmenorrhoea" (*la dysmenorrhee membraneuse* of the French pathologists) may relief or improvement possibly be given by curettage, especially when this is accompanied by the improvement of other underlying conditions.

Thirdly, in the generally painful pelvis, has it any indication? (A) Here again if we have to deal with an existing salpingitis, secondary to a former infection, it is positively contra-indicated. (B) If the painful pelvis is due to a tumour of the uterus or ovary no good will ensue from the curettage. (C) Often the painful pelvis in woman arises from, or is closely associated with a painful abdomen due to

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chronic entero-colitis, to which women are particularly prone on account of their usual constipated habit and their nervous temperament; of these a determining cause may frequently be found in a diseased appendix, or in an infected gall bladder as well as in an inflammatory condition of the pelvis.

Fourthly, is curettage of value in haemorrhage? Yes, and no; and here we come to a more practical issue. A.—If the haemorrhage is caused by a tumour, (and in such cases the uterus is both larger and harder to the examining finger) curettage, if not harmful, usually is of no avail since it cannot affect the underlying causes of the haemorrhage, that is the tumour, unless it should happen to be a small polypoid growth, and this is a very exceptional condition. B.—If we have reason to suspect a cancer—from the age of the patient, the recurring haemorrhage after menopause has already set in, the malodorous discharge, the increasing anaemia, and the dull and at times shooting pains—a curettage may be carefully done, but only in order to bring back debris for a microscopical examination. Curettage in this instance should be regarded as a biopsy rather than a surgical intervention. C.—If the haemorrhage is due to the so-called *sclerosis uteri* as met with in an elderly woman about the time of menopause, curettage is again of no avail. D.—Still more if the menorrhagia is a consequence of chronic metritis complicated by malposition and diseased adnexa as we have already mentioned curettage will seldom improve, but will rather aggravate the patient's condition. Under special circumstances it may be undertaken preliminary to a laparotomy which will allow the specialist to correct the malposition and attend to the adnexa. Usually such cases of long standing painful pelvis are better treated by sub-total hysterectomy with conservation of at least one, and if possible of both ovaries for their internal secretions. So many gynaecologists are too prone to forget that the ovaries are as needful to the woman's equilibrium and good health by their internal secretions as the same glands in man. Let all of us, and particularly the gynaecologist, not forget the old saying: *Tota mulier in utero*: the heart and soul of a woman lie in her pelvis. E.—Should the haemorrhage be a sequel to a miscarriage or confinement and should the blood flow continue for 4, 6 or 8 weeks, or show up intermittently but with frequency and abundance, curettage is indicated to clean the uterus of placental or membranous debris which is remaining *in situ* and has given rise to a fungus type of haemorrhagic endometritis.

Fifthly, in cases of acute post-obstetrical infection, will curettage help the patient? On this particular point opinion has varied. Experience has brought us to the following conclusions: (1) if the patient suffers from abundant haemorrhage which endangers her life, curettage very gently done to remove the debris, or still better a swabbing of the uterine cavity—*un curage et non un curetage*—preceded by an antiseptic and an abundant intra-uterine lavage is not contra-indicated. (2) After which we pass a rubber tube, fenestrated at the end, into the uterine cavity and leave it protruding slightly at the vulva; through it flushing of the uterine cavity can be done 3 or 4 times a day without disturbing the patient, while at the same time we assure a good drainage. (3) The administration of ergot is desirable to close the uterine muscle and prevent further absorption. (4) Vaccine and serotherapy, proteintherapy, with which we are presently experimenting, seems to have a beneficial effect in stimulating a protective leucocystosis.

Conclusions.

A.—In chronic metritis usually accompanied by malposition of the uterus and salpingitis, curettage is of no avail and rather harmful.

B.—In the dysmenorrhoea of the non-infected woman it is equally non-effective; other means must be resorted to.

C.—In acute infections following miscarriage or delivery, only in very exceptional cases is curettage to be done, and then in a very delicate manner to remove intra-uterine necrotic debris; as aforesaid other therapeutic means are to be associated.

D.—In the haemorrhagic class of cases, curettage may be advised. In cancer for microscopical research, and precision of diagnosis only; in very advanced cases the specialist may be called upon to curette and destroy vegetations too haemorrhagic and offensive. These are exceptional cases. 2.—In haemorrhage caused by tumours as fibro-myoma, curettage is seldom harmful but seldom useful. In fact curettage seems to have its principal indications

in two classes of cases only; for microscopical examination in doubtful cases of cancer of the corpus uteri, and for remedying profuse and continuous haemorrhage consecutive to delivery or miscarriage. In other instances it is usually useless and generally harmful.

And we close these remarks with the words of Comyns Berkeley, which we abstract from the *British Medical Journal*, p. 90, 1923.

"Curetting is constantly abused by being performed for most of the conditions which may be attributed without adequate reason to local disease of the uterus. In a large number of cases the operation does no good on account of the peritoneal complications which ensue."

TRANSPERITONEAL CERVICAL—CAESAREAN SECTION

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THE mortality of classical Caesarean section except in specially selected cases still remains distressingly high. Beck showed that of Caesarean sections done in Long Island College Hospital, the mortality in cases treated wholly in the hospital was slightly over one per cent; in cases operated on after a test of labour the mortality was ten per cent; while in those cases known to have been handled before admission, and in which, as alas, is too often the case, the surgeon was tempted to take a chance, the mortality was sixteen per cent.

Every surgeon who has faithfully followed his fatal Caesarean to the post-mortem room knows that death, except from unavoidable causes such as eclampsia, is almost always due to general peritonitis from seepage of sepsis through the uterine suture line.

As early as 1907 Frank of Cologne tried to prevent this by reviving the old discarded extra-peritoneal approach to the uterus of the pre-aseptic days. Numerous operators, notably Küstner and Latzko, followed his lead and improved his method, but all the operations devised were of great technical difficulty and remained weird and wonderful procedures not to be undertaken by the average surgeon. It remained for Krönig of Freiburg in 1912 to show that a transperitoneal approach to the retrovesical lower uterine segment made a much simpler operation and yielded the same net result. In his original operation the bladder was freed with a triangular flap of loose vesico-uterine peritoneum in the centre and pushed down off the lower uterine segment as in abdominal hysterectomy. The triangular flap was later sutured up over that part of the uterine incision which extended above the bladder area. Beck, in an effort to reduce the mortality from Caesarean section, tried the Krönig operation. The results were encouraging. One case, however, died from the triangular peritoneal flap sloughing loose, sliding down, and allowing sepsis to seep through the exposed upper end of the suture line. He then improved the operation by dividing the vesico-uterine peritoneum transversely well down on its loose uterine attachment and raising an upper flap, to be sutured down later over the upper end of the uterine incision before pulling the bladder well up over all. Twenty-nine operations were performed with this technique, some on potentially infected cases, without a fatality. This modification is now generally adopted.

Opitz has independently described a modification similar to that of Beck which also provides for gauze drainage of the retrovesical space through an opening made in the upper vagina. Owing to the extreme rarity, however, of post-operative retrovesical abscess, which can be easily evacuated by anterior colpotomy, vaginal drainage as a routine procedure is unnecessary. De Lee suggests that the fascia between the uterus and bladder be sutured as a separate layer with the suture line off to one side as an extra seal to the uterine wound. He

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also warns against attempting this operation in an excessively fat subject, owing to the technical difficulty.

Krönig's transperitoneal cervical Caesarean section (a name there is no reason to change), with a slight improvement by Beck and made safer by the introduction of De Lee's special knife, is now well within the reach of the general surgeon.

Operative Technique

The patient having been catheterized and the catheter left in situ, and an ampoule of ergot having been given, the abdomen is opened with the patient in the Trendelenburg position, as in laparotomy for any pelvic condition. The incision is made in or slightly to one side of the median line and extends from the symphysis to about three centimeters below the umbilicus. The anterior layer of the rectus sheath is divided to the pubic bone to ensure good exposure at the lower angle. The inner flap is raised with forceps while the inner edge of the rectus is separated from it with the handle of the knife and retracted outwards. The peritoneum is opened at the upper angle and the incision carried down by pushing with half opened scissors, curving off to the left of the apex of the bladder, should the latter lie high on the abdominal wall. The bladder now lies flaccid in the pelvis. The loose vesico-uterine peritoneum is located by making it slide with the finger, and incised transversely with a gentle stroke of the knife two centimeters below its firm attachment. This incision should extend five centimeters on each side of the mid-line. The bladder is now pushed well down with a sponge-on-holder. It will be found to separate very easily. The upper flap is loosened by spreading curved Mayo scissors under it at several points. The second assistant now holds the bladder well down with a Deaver retractor and the operator marks the upper and lower limits of the uterine incision with Allis clamps. The upper one is placed as high as possible up under the upper peritoneal flap and the lower one close to the retractor holding down the bladder. Traction sutures may be used if the Allis clamps will not hold. The first assistant's left hand now pulls the uterus up out of the pelvis as far as possible thus giving a better exposure of the lower uterine segment. A hypodermic of pituitrin is now given in the arm or chest. Through a tiny incision in the uterus close to the upper Allis clamp the De Lee knife is inserted, carried down just inside and punched out through the wall again beside the lower

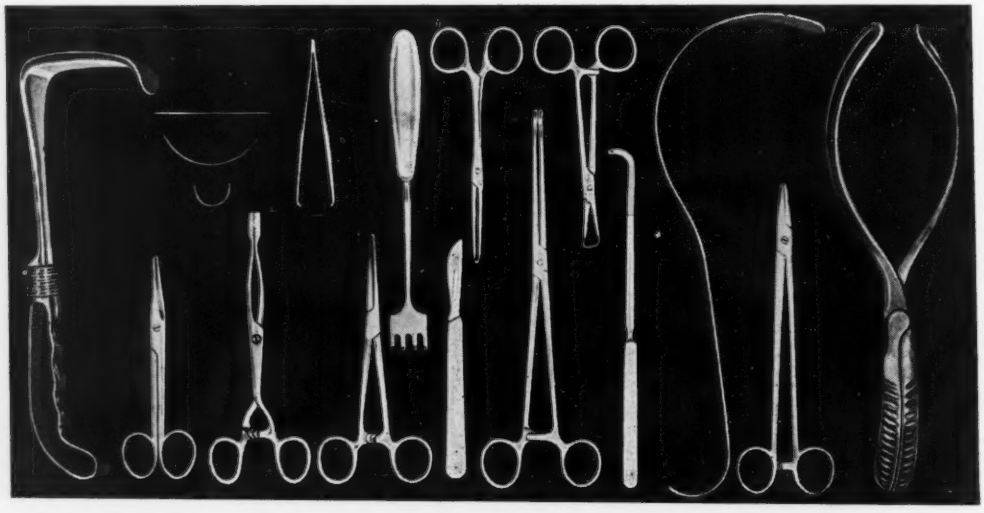

FIG. I.—INSTRUMENTS REQUIRED

Top Row—Keith's abdominal needle 1, full curved large surgeons' needles 3, Mayo catgut needles 4, Deaver's mouse-tooth tissue forceps 2, Volkmann's retractors 4 prong 1 pr., Allis' clamps 2, Backhaus towel clamps 6. *Bottom Row*—Kelly retractors 1 pr., curved Mayo scissors 1 pr., Collin's tongue forceps 6, Rochester-Carmalt clamps 8, scalpels 2, sponge holding forceps 2, De Lee knife 1, Deaver's 2 inch retractor 1, Mayo needle holder 1, and obstetrical forceps. In addition for the deeper pelvic work a long pair of tissue forceps is sometimes useful.

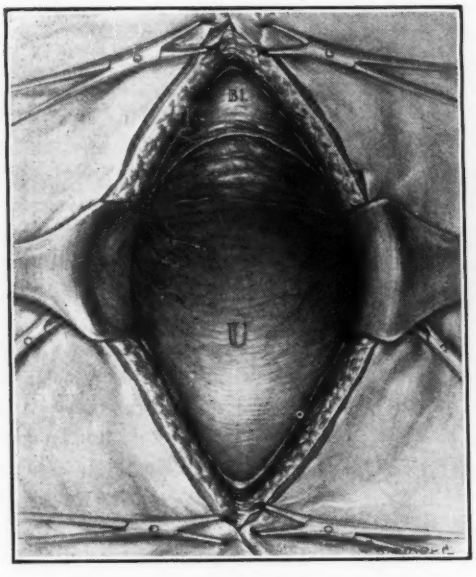

FIG. II.
Showing the abdomen opened below the umbilicus. The loose vesico-uterine peritoneum has been divided transversely two centimeters below its firm attachment to the uterus and the bladder pushed part way down.

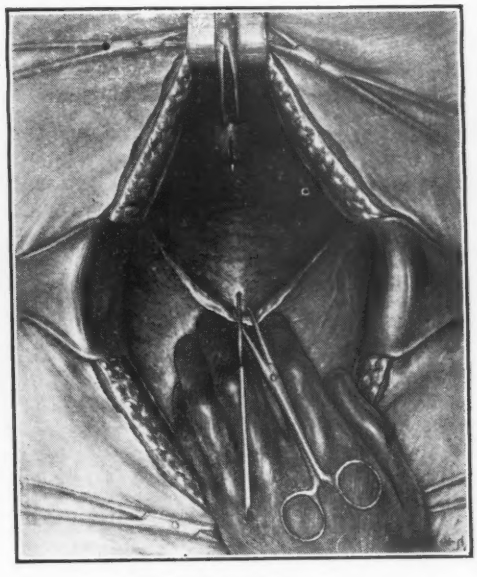

FIG. III.
Showing the De Lee knife laying open the lower uterine segment while the first assistant's left hand pulls the uterus up out of the pelvis.

Allis clamp. It is then drawn up with a fine sawing motion laying open the lower uterine segment.

The face may be pulled into the wound by a finger introduced into the mouth, and if necessary forceps may be applied. In other presentations the feet may be grasped. After the removal of the child if the haemorrhage is severe the edges of the incision should be grasped with tongue forceps while the placenta is removed and the cavity wiped clean with dry gauze.

The uterine wound is readily closed with two layers of continuous No. II chromic gut. The first layer approximates the inner half of the muscular wall, avoiding the decidua, and the second the outer half. Care must be exercised not to mistake thick decidua from which the muscle has retracted for the thin wall of the lower uterine segment. The upper peritoneal flap is then tacked down with three or four interrupted sutures of plain gut, and the lower flap bringing with it the bladder is pulled up by forceps until it overlaps the upper one and is sutured to the peritoneum of the uterus with continuous plain gut.

The uterine incision is now completely sealed off and the only evidence of intra-abdominal interference is the almost invisible suture line along the top of the bladder. The abdomen is closed without drainage, retention sutures of silkworm gut or heavy silk being used.

Illustrative Cases

The following two cases which, previous to our newer knowledge would have run a fearful risk of losing their lives by classical section or have lost their babies by craniotomy, illustrate the possibilities of the new operation.

Case 1. (patient of Dr. V. H. Craig)—in labour thirty hours, the last six of which the pains were very severe, membranes ruptured, vaginally examined, no engagement, approaching rupture of uterus feared. Transperitoneal cervical Caesarean section, bled profusely, sterilized, transfused 800 c.c. unaltered blood 24 hrs. after operation. Sapremia with very foul lochia for several days, convalescence otherwise uneventful.

Case 2. (patient of Dr. C. T. Bowles)—Two previous normal deliveries of five pound babies. In labour forty-six hours, membranes ruptured, forceps attempt before admission. No engagement. Transperitoneal cervical Caesarean section under spinal anaesthesia given by Dr. Geldert (patient had influenzal bronchitis), haemorrhage almost nil, baby delivered easily without forceps. There was a sapremia with very foul lochia for several days necessitating the use of vulvar pads soaked in Dakin's solution to keep down the odor. Severe cough persisted for a week with no harm to the wound except a stitch abscess. Baby weighed seven pounds and had forceps marks on its head.

Conclusion

While the teaching of recent years has impressed on us the sacred duty of keeping clear

of the parturient vagina except when absolutely necessary and then treating it like the peritoneal cavity, cases will still occur which are potentially infected and cannot be delivered from below. We can now offer such a patient a relatively safe chance of rescuing her baby alive. An operation which will do this must be regarded as one of the greatest developments of modern surgery.

My thanks are due the Canadian Air Board for photographing the instruments, and to Mr. Ivan Summers for the two splendid illustrations drawn from the writer's sketches.

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ACUTE INTESTINAL INTOXICATION IN INFANTS*

AN ANALYSIS OF SEVENTY-FIVE CASES TREATED IN THE HOSPITAL FOR SICK CHILDREN, TORONTO, DURING THE SUMMER OF 1922†

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Toronto

ACUTE intestinal intoxication may be defined as an acute metabolic disturbance with a predominance of gastro-intestinal symptoms, occuring in infants and young children, during the hot weather. It is characterized by its sudden onset, with collapse, vomiting, usually diarrhoea, frequently hyperpnoea, moderate leucocytosis, varying degrees of pyrexia and dehydration.

Etiology.

(1). *Predisposing causes.*—The close relationship between the temperature of the air and the morbidity of this disease is perhaps the most striking feature concerning it. Nearly all the cases are seen in the summer and develop towards the end, or after a protracted hot spell. The mode of action of the heat has not been determined. Its effect has been attributed to direct heat stroke or to its action on the food by causing an increase in the number of organisms and consequent decomposition.

The perusal of the feeding histories of these children brings out two facts, (1) the small number who have been breast fed, and (2) the frequency of change in the feeding. In our series only five infants had been breast fed for any effective length of time, and none of these were breast fed at the onset of the illness. The second observation is important in that it indicates the presence of a previous gastro-intestinal upset. Acute intestinal intoxication is rare in a perfectly healthy baby. Among the artificial feedings, highly refined carbohydrate rich foods are most at fault. The morbidity and mortality are both increased by their use. Rational cow's milk dilutions appear to be best when the nurse fails.

	No. of Cases	*Per cent Mortality*
1.—Rational cow's milk dilutions.....	17	50
2.—Patent food (rich in carbohydrates)..	38	74
3.—Cow's milk dilutions (not rational)..	20	56.6

Age.

There is a gradual increase in morbidity up to six months, at which the peak is reached. Following this there is a steady fall, until a slight rise occurs again between eleven and twelve months. There is a steady fall in the percentage mortality, with increasing age.

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†Cases of Infectious Diarrhoea, (Dysentery) are not included in this series.

From the Wards and Laboratories of the Hospital for Sick Children and the Department of Pediatrics, University of Toronto.

(2). *Active causes.*—The primary cause of acute intestinal intoxication may be, (1) Production of some toxic substance from the food by decomposition; (2) Improper foods; (3) Infection of the intestinal wall with bacteria; or, (4) Abnormal absorption of catabolites from the bowel. Numerous bacteriological researches have failed to reveal a pathognomonic organism. Mellanby[1] in 1915 suggested the possibility of an amine base, which could readily be formed from histidine, a non-toxic substance, found normally in the bowel. He produced comparable symptoms in animals by injecting the B. amino-adzalethyl-ethylamine into their gastro-intestinal tract. From our experimental work[2] we consider the cause of acute intestinal intoxication to be a circulating toxin, produced in the mucous membrane of the bowel. Chemically the substance resembles closely an amine base, and possibly is the normal toxie substance found by Starling[3] in bowel mucous membrane. Further work is being done to determine whether the symptoms are due to an over production or increased absorption of this substance. Numerous organisms may play a secondary rôle in producing the poison by converting a harmless protein split product from an acid to a toxic basic substance.

Pathology.

There are no characteristic pathological lesions. The commonest, and frequently the only, abnormality seen is a fatty liver. This change was observed in 75 per cent. of our cases in the gross. Microscopically it is almost universally present and is lobular in type. The fatty changes were more marked in the very acute cases.

No pathognomonic changes were seen in the bowel. Cases having a history of previous gastro-intestinal upsets presented a catarrhal enteritis in some instances. Circulatory changes, varying from congestion and petechial haemorrhages, to, in two cases, actual ulceration were seen. These latter changes are those seen in any intoxication caused by proteins, or their split products.

The other organs were normal, unless some complications such as broncho-pneumonia had been present.

Symptoms and Signs.

The onset of the intoxication is sudden. It is usually preceded, or accompanied by diarrhoea. Occasional cases with constipation occur. Convulsions are common. Refusal of food and vomiting are the rule. The temperature is usually 103°–105° F. The facies is characteristic, with staring, sunken eyes, open mouth, and very often muscular twitchings. Leucocytosis is moderate, 10,000–13,000, and could almost be accounted for by the concentration of the blood. Loss of weight is rapid. This is chiefly through salt and water loss by way of the bowels and lungs. The degrees of intoxication and dehydration were the same in most of our cases, and in no case was the intoxication greater than the dehydration, and the reverse was only noted twice. The liver is usually enlarged, and its size furnishes a rough indication of the degree of intoxication present.

Treatment.

Prophylactic treatment affords the most hopeful means of combating this disease. The urgency for breast feeding is indicated by the greater prevalence of the disease among artificially fed. When artificial food must be used, proper dilutions of cow's milk are best. Such mixtures should be boiled to render them more constipating and to destroy bacteria. Overfeeding, with either the breast or an artificial food should be guarded against. Any diarrhoea should be treated promptly. Abundance of fresh air, light clothing and cleanliness should be insisted upon. Abundance of fresh air, light clothing and cleanliness should be insisted upon.

During the summer of 1922, all infants suffering from the disease were put under the care of the authors. A definite plan of treatment (seen below) was drawn up, and infants on admission were placed in turn in the different groups. The only exception to regular rotation was made in cases of infants admitted in a moribund state and from whom we did not feel justified in withholding the benefits of exsanguination transfusion.

Treatment.—(*a*) Starvation period of 12 to 48 hours depending on degree of toxicosis. Water by mouth—quantities recorded, saline subcutaneously, intraperitoneally and intravenously, followed by 2 per cent. lactic acid milk feeding.

(*b*) *Same starvation period.* Water by mouth, glucose 5 per cent. subcutaneously, intra peritoneally and intravenously 2 per cent. lactic acid milk feeding.

(*c*) *Same starvation*—
and fluids as in (a), but protein milk powder feeding.

(*d*) *Same starvation*—
and fluids as in (b), but protein milk powder feeding.

(*e*) *Same starvation*—
but exsanguination transfusion followed by fluids and food as in (c).

(*f*) *Same starvation*—
but exsanguination transfusion followed by fluids as in (d).

(*g*) Same as in (e) and (f) only using 2 per cent. lactic acid as food.

(1) *Dehydration.*

Making up the water loss, which is always present, is the most urgent treatment needed. As much water, or 5 per cent. glucose, as the infant could take was given per os. This amount was often small in amount, due to the infant's refusal to take water, and the frequent vomiting which ingestion of anything by mouth induced. Fluids were therefore given by the interstitial and intravenous routes. Normal saline and 5 per cent. glucose were used. Little difference was noted in the value of these fluids. Intravenous administration produced more immediate improvement, and was used in all cases at first. Interstitials were given two or three times a day, from admission until the child could take sufficient fluid by mouth.

(2) *Toxaemia.*

A means of directly combating an unknown toxin is not easily found. The presence of a circulating toxin, suggests however, the removal of the medium in which it is, and its replacement by another fluid. Removal of the patient's blood, which contained the toxin, followed immediately by transfusion from a suitable donor, suggested itself as a feasible means of doing this. The transfusion would also aid in treating the dehydration, as more blood was usually given than was withdrawn. Early in the summer cases fell into the exsanguination transfusion groups in rotation; later on, the worst cases were all treated in this manner as it afforded their only hope of recovery. As will be seen in the table below, the cases most benefitted by this procedure were those generally considered hopeless. The mild cases did just about as well when their dehydration was treated by saline or glucose only. The most striking benefits from exsanguination transfusion were seen in those very acute cases in which there was a sudden and rapid development of the symptoms.

Exsanguination Transfusion in Intestinal Intoxication.

(1) Moribund on admission.
11 cases — 9 deaths
Mortality 81.8 per cent.

	Cases	Deaths	Mortality
Without exsanguination transfusion	6	5	83.3
With " "	5	4	80.

(2) In poor condition on admission.
38 cases — 20 deaths
Mortality 52.8 per cent.

	Cases	Deaths	Mortality
Without exsanguination transfusion	15	11	73.3
With " "	23	9	39

(3) In fair condition on admission.
25 cases — 12 deaths
Mortality 48 per cent.

	Cases	Deaths	Mortality
Without exsanguination transfusion	16	8	50
With " "	9	4	44.4

(3) An initial period of starvation, its length varying with the condition of the child, was instituted in all cases. Following this, dilutions of protein milk or 2 per cent. lactic acid milk were given. The protein milk was usually made from the powdered protein milk, but in certain protracted cases, the substitution of liquid protein hastened the cure. The stools become normal a little sooner on the protein milk, either liquid or powder, than on the lactic acid milk. The average time taken to effect this change was 29.5 days in the former and 32.4 in the latter, the minimum time with the protein milk powder was five days, and with 2 per cent. lactic acid milk 14 days. Formed stools were obtained sooner with liquid protein than with the powder. No difference was observed in the amounts of these foods the child would take or in their influence on vomiting or other symptoms. As the stools improved the child was placed on higher concentrations of these foods or on a boiled 2 per cent. milk mixture. Carbohydrates were added gradually. Dextri-maltose is apparently the best of the sugars.

(4) *Medicinal.*

Medicines are of little use in the treatment of this disease, aside from stimulants during the collapsed stage. Chalk mixtures were tried in a few cases without appreciable results.

The following table shows the effect of the different treatment groups on the mortality,

	Per Cent Mortality	
A.—(Saline 2% L.A.M.)	100	(1 case)
B.—(5% Gluc. 2% L.A.M.)	50	
C.—(Saline P.M.P.M.)	33	
D.—(Glucose P.M.P.M.)	74	
E.—(Saline P.M.P.M. Ex. Trans.) ...	25	
F.—(5% Gluc. P.M.P.M. Ex. Trans.)	41.6	
G.—(Saline or 5% Gluc. L.A.M. Ex. Trans.)	53	

P.M.P.M. = Protein milk powder mixture.

Conclusions

1.—Heat is effective in the causation of the disease.

2.—There is a toxin, probably an amine base, produced in the bowel which circulates in the blood, and is capable of producing all the symptoms of the disease.

3.—The only constant pathological finding is the fatty degeneration of the liver. Circulatory changes, such as are caused by injection of foreign protein, are fairly common in the mucosa of the small bowel.

4.—Breast fed infants are in the minority of those affected.

5.—Highly refined, carbohydrate rich foods are the foods used in the majority of cases.

6.—Gastro-intestinal derangements, however mild, are noted in the histories of most cases.

7.—It is of paramount importance to make up the fluid losses by interstitial and intravenous therapy. There is little to choose between normal saline and 5% glucose for this purpose.

8.—Exsanguination transfusion offers the most successful means of combating the toxin particularly where there is a sudden and profound toxaemia. It should be tried, no matter how hopeless the case appears.

9.—During the acute stage, the food should be fat and carbohydrate poor. Such feedings are protein milk and 2 per cent. lactic acid milk.

10.—Medicines are of little use.

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ACUTE INTESTINAL INTOXICATION

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ACUTE intestinal intoxication, which is so prevalent in our cities during the hot summer months, has as we all know, a very high death rate. At the Hospital for sick Children, Toronto, during the year 1920, the mortality in this condition was 58 per cent.; during the following year, 1921, the mortality was still above 50 per cent. and this in spite of the best known methods of treatment[1].

In the face of this it must appear obvious that if we are to reduce the mortality in acute intestinal intoxication, the condition itself must be better understood, especially by the man in general practice, who usually sees these cases first, in order that we may recognize the condition during the very early stages, and secondly, that we may understand the proper treatment of the condition which, after all, at this stage is very simple.

That the diagnosis of intestinal intoxication presents certain difficulties we are forced to admit, so in this paper I will deal only with the clinical aspect of acute intestinal intoxication in infancy and early childhood, a condition also referred to as toxicosis, alimentary intoxication, food intoxication, summer diarrhoea, cholera infantum, ileocolitis, and there are still other terms used to designate practically the same symptom complex, as that found in intestinal intoxication.

This condition which is always preceded, if only for a short time, by some nutritional disorder, is one of profound toxaemia of intestinal origin, and of course means a severe disturbance of metabolism.

Diagnosis.—In cases of severe intestinal intoxication the nervous symptoms present, viz., the twitching of the muscles of the face and hands and arms, with a rigid neck and sometimes convulsions along with the profound

toxic appearance of the patient, have caused many a case to be diagnosed as one of meningitis, and as a result proper treatment has not been started (one of the factors in our high mortality).

A careful investigation of the subjective history of the case with particular attention to the feeding history and any account of previous gastro-intestinal disturbances, along with a depressed fontanelle, enlarged liver, and the general condition of dehydration of the tissues, will assist one greatly in making a correct diagnosis. If doubt still exists lumbar puncture, with examination of the spinal fluid, will rule out the presence of meningitis. The clinical picture of an acute intestinal intoxication resembles also that met with in an acute pyelitis. But here the microscopic examination of the urine will prevent a mistaken diagnosis.

Symptomatology.—The condition is characterized by a sudden onset, vomiting, loose watery stools, at first yellow in colour, then yellowish-green, and later on simply large green watery stains. The stools which contain a good deal of mucus with undigested milk, chiefly fat curds, are invariably acid in reaction, and have a sour odor. The infant expels a good deal of gas, and apparently has considerable colicky pain before passing a stool. There is a rapid loss of weight and a steady rise of temperature, which may within a very short time reach 104° or 105°. The vomiting is generally present at the onset, but does not continue throughout. In the majority of cases a diarrhoea is present, but at the same time it is possible to have an acute intestinal intoxication without a severe diarrhoea.

The facies is very typical in this condition. The eyes have a sunken appearance, and are rolled up, the mouth is open and the lips are dry. The skin is ashen in colour and dry and loose and has lost its elasticity, giving one the impression of a sudden loss of body fluids. The fontanelle is depressed, the extremities are cold, often the thirst is intense. If the condition progresses, within a very few hours there will be extreme prostration, deep, rapid, but pauseless breathing without cyanosis; occasionally there is Cheyne-Stokes respiration and this disturbance of respiration is due to the condition of acidosis present. The appearance of convulsions with oncoming stupor and coma is generally followed in a few hours by death as the result of an overwhelming toxaemia.

A few words on the *etiology* of this condition may now be given and firstly the *predisposing causes* will be considered. It is much more prevalent during the summer months and in artificially fed infants during the first year of life. Those infants fed upon proprietary foods, high in carbohydrate content, are especially prone to this condition. It is possible to find this condition in breast fed infants, but is not often met with. When it is, it is not as severe and the prognosis is better than in artificially fed infants. Previous alimentary disturbances and the presence of rickets are very important predisposing factors. The action of heat is not clearly understood, but it appears to have an important bearing upon this condition. It may be by its action upon milk, increasing the number of bacteria present, or it may be the direct effect of heat upon the infant's body, a form probably of heat intoxication, which reduces the infant's resistance.

The active causes.—There are numerous theories put forth as to the cause of this condition. Four of these appear to have many exponents. (1) Some element of the food, generally looked upon as the sugar. (2) Decomposition of the food. (3) Bacterial infection. (4) Dehydration theory.

(1) It is the opinion of Finkelstein and Meyer[2] that sugar intoxication accounts for a large proportion of our cases of acute intestinal intoxication. They have proved conclusively that milk sugar, also cane and grape sugars, will produce of themselves intoxication, and it appears to be a clinical fact that a high fat content of food aids in the production of the intoxication, and we know that the withdrawal of sugar hastens recovery.

(2) Czerny and Keller[3] describe a symptom complex, identical with acute intestinal intoxication, which they call toxicosis. It is their belief that the condition is due to the decomposition of food by bacteria; as a result we have the incomplete splitting of fats and the absorption of these products which causes a derangement of metabolism.

(3) Bacterial infection of the intestinal canal. Many workers have put forth this theory, but I believe to-day it is only looked upon as playing a part in that type of intox-

ication associated with a true infectious diarrhoea.

(4) Dehydration theory. As the result of the dehydration and ultimate lack of water in the tissues, oxidation processes are impaired and it is quite probable that poisonous derivatives of body protein katabolism carry on the toxic condition. This theory is supported by the fact that detoxication always occurs as soon as water retention is established. In the recent translation of Feer's *Paediatrics*[4] he deals with this theory.

Howland and Marriott[5] have proved beyond a doubt that during the acute stages of an intestinal intoxication a very severe acidosis exists. This coupled with the great loss of body fluids containing salts, along with a deficiency in the sugar handling properties of the patient, indicates a severe disturbance of metabolism. These factors give us valuable hints as to the line of treatment to be adopted.

Course and prognosis.—Evidently there are many degrees of severity of this disease. There are cases on record where death has taken place within 24 hours of the time of onset of the first symptoms. Such cases are usually in very young infants. In older children two and three years of age the intoxication is generally of a much milder type.

Probably the greatest factor in a favorable prognosis is the promptness with which proper treatment is instituted.

A persistent high temperature with continuous vomiting and stupor, with progressive enlargement of the liver lead one to an unfavourable prognosis. The steady fall in the weight curve is also a bad prognostic sign, but when the weight curve becomes horizontal, it means that water retention has been established, and with this the toxic condition clears and the outlook becomes much more favourable.

Infants suffering from this condition are naturally in a state of very much lowered resistance, and as a result are very susceptible to any infection, such as nasopharyngitis, otitis media, broncho-pneumonia, etc., and any of these complications make the prognosis all the more grave. Age and previous intestinal disturbances play a very prominent part in prognosis. During the first six months the mortality is extremely high. Marasmus is the common sequela of acute intestinal intoxication and it is followed by a long reparative stage. The management and feeding of these cases are subjects in themselves.

The treatment and management of cases of acute intestinal intoxication may now be taken up.

Preventive measures.—Make sure the milk supply is fresh and has been pasteurized before feeding to the infant, and that cleanliness is exercised in handling it. See to it that plenty of cold boiled water is offered to the infant during the hot summer months. All unnecessary clothing should be removed and this includes especially the flannel binder. The maximum amount of fresh air should be provided, keeping the infant outside as much as possible. Reduce the amount of sugar in the formula to a minimum and if at all possible never wean an infant during the summer months. By following closely these suggestions you are simply "playing safe."

At the first sign of an intestinal intoxication *three indications stand out as all important.* (1) Do not administer a cathartic at the onset of diarrhoea, as it is perfectly evident that the bowel is already doing its best to rid itself of any noxious substance present and a cathartic will only increase the danger. (2) Stop all food. (3) Supply plenty of water.

In those cases of acute intestinal intoxication of but a few hours duration that I have seen, it is unusual for the temperature to remain high when the patient has been put upon starvation diet and plenty of water administered. If it should remain high see if there is not some complicating cause such as an upper-respiratory infection, and here let me emphasize the importance of taking extra care to prevent the infant from being exposed to any infection.

If the case is one of very mild intestinal intoxication and responds well to starvation diet and fluid treatment, it may be treated at home. All other cases should be admitted to hospital.

The starvation diet should be continued for 24 hours at least and during that time as much water as possible administered by mouth and if necessary subcutaneously in the form of a 5 per cent. glucose solution or normal saline. If temperature is not down and there are evident signs of intoxication still present, the

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starvation period should be lengthened to 48 hours and it is occasionally necessary to continue it for 72 hours especially if vomiting tends to persist. If it should be necessary to continue the starvation period into the third day, it is advisable to administer stimulants, camphor and oil hypodermically, and whiskey or brandy, at the same time administering fluids in the form of glucose solution or normal saline either subcutaneously, intraperitoneally, or intravenously. If the infant is under six months of age 150 to 200 ccs. interstitially. If from six to twelve months 200 to 300 ccs. interstitially and repeat every 8 or 12 hours as appears necessary.

If, when the patient is first seen, intoxication is pronounced and the tissues are much dehydrated, the infant should be admitted to hospital and 5 per cent. glucose solution or normal saline solution should be given intravenously, into the longitudinal sinus, (using a guarded needle). From 13 to 15 ccs. per pound of the infant's body weight should be administered and an interstitial injection as well. This is a perfectly safe procedure as the circulation will only take up the fluids from the tissues as it can handle it.

In cases of severe intestinal intoxication, exsanguination followed by blood transfusion, the technique of which is described by Robertson *et al*[6]. should be done at once and offers practically the only hope of recovery. Even with this the mortality in this type of case is extremely high. These patients should also be given fluids interstitially within 8 to 12 hours and this procedure repeated as often as appears necessary, in other words, until water retention is established when the weight curve will become horizontal.

When feeding is commenced at the end of 24 or 48 hours, start in with one-half strength powdered protein milk sweetened with saccharine and keep the infant upon this feeding until all signs of intoxication have disappeared and the child is having a normal stool, before adding any sugar to the feeding.

Now in going over this treatment which I have just outlined there are three outstanding features. Two negatives and one positive, as follows:

(1) No mention has been made of the use of sodium bicarbonate in treating the condition of acidosis present, for equally good, if not better, results have been obtained by the use of glucose solution and it can be given interstitially or intraperitoneally, while one would hesitate to use sodium bicarbonate interstitially as it is sometimes followed by sloughing. Added to this objection is the difficulty in preparing a sterile solution of sodium bicarbonate. The glucose appears to act as fuel for the increased H-ion concentration of the blood stream, and in the end practically the same result is obtained.

(2) No drugs are necessary or advisable in the treatment of either the diarrhoea or the vomiting, or of the toxic condition itself.

(3) The all important part water plays in the treatment of this condition. As soon as water retention is established in the body, detoxication occurs, and the prognosis improves.

Summary.—In this paper I have merely hoped to point out the importance of an early diagnosis for in this lies our only hope of reducing the mortality of acute intestinal intoxication at the present time, until the etiology of the condition is more clearly understood. I have also hoped to point out the simplicity of the treatment during the early stages and, as an aid to an early diagnosis, let me emphasize the importance of investigating thoroughly the feeding history and of obtaining an accurate account of the present gastro-intestinal condition, and along with this certain positive findings upon physical examination, the slightly depressed fontanelle, the enlarged liver, the typical facies, and, a little later on, the dehydrated tissues.

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CHRONIC SINUSITIS IN CHILDREN

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THE problems of accessory sinusitis in adults have received much attention for a long time now. It is only in recent years that the importance of similar conditions in children has been emphasized. Acute accessory sinusitis with its more obvious and urgent symptoms is usually recognized, but it is the chronic case with much more obscure symptoms that is liable to remain undiagnosed. An investigation, the results and conclusions of which form the basis for this short paper, was undertaken at the Hospital for sick Children, Toronto, during the year 1921-22. Some eighty cases were studied, being the number culled from about 2000 patients attending the special clinic during that time. The ages of the cases varied from five to thirteen years. Before the fifth year localization in any one of the sinuses does not usually take place, although acute ethmoiditis is occasionally seen in even younger children. Because of the small size of the cavities in children under five years, the mucosa of the nose and sinuses probably shares as a whole in any infection. For all practical purposes the nose may be considered the pathway of infection . Theoretically, the blood stream might act in this capacity. The teeth are rarely at fault, even in older children.

Before proceeding further a word or so as to the development of the accessory sinuses might be advisable. Authorities seem to differ on this subject, but as a general rule the sphenoidal sinus only attains an appreciable size at the age of five years, *i.e.*, about the size of a pea. The ethmoidal cells are present before birth and are fairly well developed even in the infant. The maxillary sinuses are well developed at birth, and at the age of five years are usually as large as a hazelnut or larger. The greatest irregularity in development occurs in the frontal sinus. It may be well developed at the eighth year but it is much more usual to find little development of importance until the 10th or even the 12th year It would appear that the ethmoidal sinuses are most commonly affected, but it is not uncommon for the maxillary sinus to be infected too. Maxillary sinusitis *per se* does occur but it is often associated with ethmoiditis.

Infection of the frontal and sphenoidal sinuses is much less common. Not one case of those examined aroused suspicions of sphenoidal infection symptomatically, rhinoscopically or radiologically. That it does occur not infrequently has been demonstrated by other observers. Only one case of chronic frontal sinusitis occurred in the series—a girl of thirteen with associated bilateral chronic ethmoiditis.

What would lead one to suspect the presence of chronic sinusitis? To summarize briefly the following signs and symptoms:—(1) Nasal discharge—especially if unilateral and the presence of a foreign body has been excluded. (2) Constant headaches. (3) Pains in the face and teeth. (4) Constant colds or sore throats. (5) Catarrhal deafness. (6) Cervical gland enlargement. (7) Epistaxis. (8) Mental hebetude. (9) Excoriation and redness of anterior nares of long standing. (10) Pallor and dullness of expression. (11) Arthritic pains. (12) Systematic infection due to local disease. In fact, the symptoms are very similar to those associated with enlarged or septic tonsils and adenoids. It is this similarity of symptoms that often leads to secondary and even further operation for the removal of adenoids and tonsils. The proven cases in our short series seemed to group themselves into one of the following classes: (1) Sinusitis associated with enlarged or septic tonsils or adenoids. (2) Sinusitis persisting after removal of tonsils and adenoids without apparent cause. (3)Sinusitis associated with nasal deformities or hypertrophies. (4) Sinusitis due to other causes.

Methods of diagnosis.

(1) Consideration of the history of the case. (2) Anterior and posterior rhinoscopy. (3)

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X-ray photograph of skull. (4) Intranasal exploration of the antrum and sphenoid sinus and lavage. Having made a careful study of the history of the case, the mucosa of the nose is well shrunken with cocaine-adrenalin solution (5% in 1-1000). Any departure of the mid turbinate bone from the normal, *i.e.* in the appearance of its covering mucosa associated or not with polypi is indicative of ethmoiditis. Pus coming from the middle meatus is diagnostic of suppuration in one or all of the anterior group of sinuses, *viz.* the anterior ethmoids, frontal or maxillary sinuses. On posterior rhinoscopy the presence of pus especially if coming from one side of the nose is very suspicious of sinusitis. Dried secretion on the vault of the naso-pharynx after the removal of adenoids is suspicious of sphenoidal infection. Hypertrophy of the lateral pharyngeal lymphoid masses, in the absence of adenoid tissue is very suggestive of sinusitis.

Transillumination in young children does not seem very dependable, possibly because of the small cavities and thick walls of the antra. In older children it has some value in helping to corroborate other evidence. X-ray photographs were found useful in demonstrating the presence of the sinuses, their shape, size and position. Density shadows are rather unreliable and can only be used in conjunction with clinical findings. In the stress of a heavy clinic it is very convenient to have suspicious cases x-rayed before further investigation.

Absolute diagnosis of infection in the sphenoid or maxillary sinus can only be made by washing out the sinus and examining the return flow. Briefly, the technique for proof puncture of the antrum is as follows:—(1) Nose flushed clear of all secretions with normal saline solution. (2) Anaesthesia: under eight years ethyl chloride after local anaesthesia; over eight years local anaesthesia. (3) A fine straight trocar and cannula is driven into the antrum through the inferior meatus and trocar withdrawn. (4) Syringe attached to cannula and three or four c.c. of normal saline blown into the antrum and withdrawn for bacteriological examination. (5) Sinus flushed until return flow is clear. The character of the contents of an infected antrum varies from mucus to old foul pus. The bacteriological results were very varied, the majority of cases yielding more than one organism. From two of the cases pure cultures of B. influenza were obtained. The most frequent organism observed was the haemolytic streptococcus. No instance of K.L. bacillus was noted. Apparently any and almost every organism may be found, but it seems to be difficult to find the causative organism. It is not usual for the organisms present to influence the treatment to any extent.

Fortunately, in children the condition yields much more readily to treatment than in adults. The treatment consists in the application of the two principles of nasal surgery, *viz.* drainage and ventilation. The vast majority of cases where the tonsils and adenoids are at fault clear up quickly when these structures are removed. The exceptional case which does persist yields as a rule to simple lavage, repeated if necessary.

Intra-nasal deformities and hypertrophies which are interfering with drainage and ventilation of the sinuses should be corrected or removed. Two cases of maxillary sinusitis very quickly cleared up when a high deflection of the septum was corrected. Polypi when causing trouble should be removed. The ethmoidal cells may be drained by removing the anterior end of the middle turbinate and gently curetting away the inner cell walls.

Extensive intra-nasal operations in children are contraindicated. Very occasionally it is necessary to open the antrum through the nose. To illustrate this the following case is cited:—H. H., Age 10; complaint—purulent right sided nasal discharge which has persisted for eighteen months. History of right combined intra and extra-nasal antrum operation fourteen months ago; tonsils and adenoides removed in infancy. On examination the right passage of the nose was filled with a white muco-purulent cast. The septum was markedly bowed to the left side, obliterating the left passage. The turbinate bones on the right side were very small and there was a large opening under the inferior turbinate leading into a shallow antrum cavity.

Dec. 12/22.—Submucous resection. Septum returned to middle line creating a left passage and cutting down size of right passage by half. This enabled the child to blow its nose properly and get rid of secretions; also to use a

cleansing lotion. When seen six weeks later there was no complaint of nasal discharge. The nose was clear and no treatment necessary.

This case would suggest that over-ventilation may be conducive to collection of discharges in the nose. Such a condition of things is seen in cases of atrophic rhinitis. Whether the sinus infection, when present in cases of atrophic rhinitis, is the cause or effect of the nasal condition is not known.

Three such cases were noted. Here the results of treatment are disappointing: all that seems feasible by way of treatment is regular cleansing of the nose and maxillary sinuses. No operative procedure is advisable, especially the removal of adenoids. Cases of sinusitis have been reported as due to syphilis or tuberculosis, but it is difficult to say if the general disease is the actual cause or merely favours infection of the sinuses. Conversely, local infection is well known to be the cause of systemic infections. In adults the relationship to systemic infections is very commonly seen, probably the greater difficulty in diagnosis accounts for this relationship in children being so rarely established. But that such a relationship does exist is none the less certain.

There are many difficulties in the investigation of the sinuses in children: considerable time and patience is required. It was found necessary in some cases to admit the patient to hospital so that the work could be carried out at leisure.

For this reason alone it would seem that many cases go undiagnosed, and what is thought to be an uncommon condition is in reality relatively common. In closing, I wish to take this opportunity of thanking my colleagues in this work, especially Dr. E. Boyd, chief of service, for excellent advice and sympathetic co-operation.

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Sir William Dalby Memorial Prize.—Lady Dalby has recently handed to the Royal Society of Medicine the sum of £500 to be invested for the purpose of providing a perpetual memorial of her husband, the late Sir William Dalby, who was a well known otologist in London. The trust deed provides that the interest on the capital sum is to be accumulated for five years, when the product, less expenses, is to be awarded as a prize to the person who, during the previous five years, has produced the best original work done or published for the advancement of otology. The prize will be awarded by the Council of the Royal Society of Medicine upon the recommendation of the President and Vice-Presidents of the Section of Otology. The Society has one other similar fund, founded in memory of Dr. R. T. Nichols; under it the proceeds of a sum of £2,200 is awarded in recognition of the most valuable contribution to the prevention of puerperal septicaemia. It has also a Gibson Scholarship to assist medical women in research work. The Society not long ago received a bequest of £500 for an annual Lloyd Roberts lecture. It values very highly certain bequests and gifts it has received for its building and library. Thus its largest lecture room, the Robert Barnes Hall, was founded with a sum of £4,000 to commemorate Dr. Robert Barnes, a famous obstetrician in his day; and the Marcus Beck Laboratory, founded in memory of that beloved surgical teacher; it has also the Marshall Hall Room, by which the library facilities are improved, the Chalmers room, in which the library of the late Dr. A. J. Chalmers is housed, and a library room inscribed to Sir William Allchin. It has also two committee rooms, one to the memory of Henry Louis Florence, and the other to Joseph Toynbee; and finally the Frederick J. Gant bequest of £500 for the purchase of books to enlarge the Gant Library. The charters and by-laws provide that even in the event of the present building being destroyed or given up the name commemorated shall be preserved in any new building by the appropriation to it of a similar room.—*Brit. Med. Jour.*, July 28, 1923.

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HEART DISEASE IN CHILDREN*

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IN taking up so large a subject as heart disease in children one can necessarily only give a few of what he considers salient points in the time allotted at this meeting. I first desire to draw your attention to a few points about congenital cardiac malformations because I have a strong feeling from personal experience that this condition is frequently overlooked and that often the points of distinction between it and acquired lesions is not sufficiently understood. When I draw your attention to the fact that 12.9% of the cases attending our cardiac clinic at the Hospital for Sick Children, Toronto, are diagnosed as congenital morbis cordis you will realize how important it is for the medical man to be thoroughly conversant with the signs and symptoms of this condition.

I do not propose to dwell upon the maze of lesions which may exist combined or separately, because having diagnosed a cardiac condition as a congenital lesion it is frequently impossible to do more than guess at what the lesion is before death. So many of us, however, have been accustomed to associating congenital cardiac malformations -only with the so-called blue baby, marked cyanosis, or clubbing of the fingers that when we discover a murmur on examination of a heart and some or all of these signs are not present, the possibility of the lesion being a congenital one does not always enter one's mind. Just here I should like to point out that cyanosis and clubbing which usually go together, occur only in about one-third of the cases of congenital cardiac malformations.

Regarding the symptoms, cyanosis is of course one of the most striking when it occurs. Clubbing of the fingers is usually proportional to the cyanosis. Shortness of breath is frequently noticeable especially on exertion. Polycythaemia occurs in the cases having cyanosis. Interference with nutrition as would be expected is commonly present.

The age incidence is a most important factor. It should be remembered that rheumatic heart disease is practically unknown under two years of age and is very uncommon under three. Practically always a bruit heard in infancy means a congenital lesion. Frequently one gets a history from the mother that she was told of a heart murmur at an early age which suggests at once the diagnosis.

In the physical signs of congenital cardiac malformations we have a definite means of distinguishing it from acquired heart disease. It is all important to locate carefully the point of maximum intensity of the bruit. A systolic bruit is heard on listening at the apex in a child of perhaps seven or eight years of age, and we are so accustomed to associating a bruit in this position with mitral disease that without more than a perfunctory auscultation of the heart the case is labelled mitral regurgitation. Had we listened more carefully we would have found that the bruit was loudest over the 4th intercostal space close to the sternum or perhaps in the 2nd or 3rd left intercostal spaces close to the sternum. A systolic bruit heard best in either of these positions is almost always either functional or due to congenital heart disease. It is not due to an acquired endocarditis which in children is practically always due to rheumatism and affects the left side of the heart. Congenital lesions almost always occur on the right side or at the base of the heart. This is the most distinguishing feature of the bruit of congenital heart disease that even though it be well heard over the entire praecordium it is heard loudest in a position in which it would be quite unusual for the bruit of rheumatic endocarditis to have its point of maximum intensity. The bruit is usually harsh, but it may be so soft as only to be heard on careful auscultation.

One point which nearly always impresses one

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in the examination of these cases is that the left border of the heart is not beyond the nipple line nearly so far as it would be in an acquired condition having similar auscultatory findings. The right border will, however, be out beyond the normal.

The thrill of congenital heart disease is only characteristic in so far as it occurs with its maximum intensity at a point which would be unusual in acquired endocarditis. With ordinary mitral disease the thrill is usually very limited at the apex; with aortic disease in children there is rarely any thrill and when present it is usually only felt in the 2nd or 3rd space. When a systolic thrill is felt in the epigastric angle or over the pulmonary area it would accord best with a congenital affection.

The presence of other congenital malformations would also, of course, be suggestive. If these points are remembered I think it will only be a very exceptional case which will puzzle you in diagnosis between congenital and acquired lesions.

Regarding the functional murmurs of childhood, we will merely mention them. Almost without exception they do not occur in infancy. The pulmonary systolic murmur is so frequent in healthy children that one might almost go the length of saying that an accentuated 2nd sound and a systolic murmur in this area are physiological in early life. It is differentiated from the congenital lesion by the fact that there are no symptoms, that the latter is rougher, of longer duration and that with it there is usually enlargement of the right ventricle and weakening of the 2nd pulmonic sound. An extra cardiac murmur is also fairly common. There is a third and quite large class of functional murmurs which are common in children and are often mistaken for endocarditis. It is necessary to remember that the heart is an organ formed to regulate the blood supply to the tissues and with a self protective organism to regulate any overstrain. The valves are not only a means of directing the onward current of the blood by preventing a reflux, but also serve to relieve any over-distension of a ventricle by allowing a certain amount of reflux. In certain forms of debility of the heart muscle this reflux may take place at the mitral orifice and a systolic murmur results. This murmur is frequently loudest midway between the left border of the sternum and the apex. Some children will invariably be found to develop a murmur on active exercise which disappears after rest. Also it is well known that children are liable to develop a systolic murmur during the course of, or for some time after, any acute debilitating illness such as a specific fever. This disappears during convalescence.

Coming now to the last and most important class of heart disease in children, *i.e.*, acquired heart disease which is practically always due to rheumatism or chorea, we find it much more common after the age of four years. As pointed out earlier it is almost unknown under two and very rare under three years of age.

Rheumatism in children manifests itself very differently in different years. I personally think it probable that when the bacteriology of this disease is thoroughly worked out that we will find several strains or groups of the infection. Certainly in some seasons the infection is much more virulent than in others. During the winter of 1919 and 1920 in England they had a particularly virulent epidemic in which I saw a good many children brought into hospital with such a virulent carditis that they died with this first attack. Dr. Robert Hutchison informed me that he remembered a similar epidemic ten years previously, but that although usually a disease of the hospital classes, this year, 1919-1920, was the first year it had attacked his private patients. Again although for some peculiar reason rheumatic nodules are not so common in this country as in England, last year we had eight cases with undoubted rheumatic nodules in the wards of the Hospital for Sick Children in Toronto, whereas to date this year I have not seen a single case. Also pericarditis with consolidation of the lower lobe of the left lung was common in the wards of the hospital during 1921 and 1922, whereas this last year we have had practically no cases. This latter may be due to the fact that the infection is not so virulent, because, although it is difficult to prove, I feel certain that this complication is a direct extension pneumonia from the pericarditis and due to the rheumatic infection.

To repeat, rheumatism in children manifests itself very differently in different years, but fortunately for us and our treatment the first

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attack except in those years in which the epidemic is very virulent, does not as a rule with proper treatment, cause such serious damage that the heart with its marked recuperative powers cannot recover so that the patient may lead a normal, or at least comparatively comfortable, existence. In the ordinary years it is the second, third and later attacks added on top of a heart already damaged by a previous attack which carries the young life off or leaves the individual a cripple for life. It is here in the rôle of preventive medicine that up to the present we find our best index for treatment. You have all experienced the feeling of helplessness which one has when you have a child with a severe carditis and a failng heart in possibly its third or fourth and probably fatal rheumatic reinfection. If we can prevent the child reaching this condition it seems so far our only satisfactory treatment. I have been labouring through the histories of all the rheumatism, chorea, endocarditis and pericarditis cases of the Hospital for Sick Children in Toronto which have been admitted during the past five years. It is difficult to arrive at accurate statistics because so many of these cases have been lost trace of since.

In reviewing 217 cases which were admitted, I found 56 cases re-admitted with re-infected hearts, and many of these had had as many as four or five re-admissions, some having a re-infection every year or oftener. In many of these cases one notices in my lists the comment "no re-infection since tags removed or tonsils and adenoids removed two or three years ago." Of over one hundred cases coming to the cardiac clinic during the past two years we have had four in which chorea has recurred following the complete removal of all foci of infection so far as we could find them; one case in which chorea and rheumatic pains recurred, and three cases in which rheumatic pains recurred. In none of these eight cases did we think they had a reinfection of the heart. We had one other case with an old adhesive pericarditis and a tremendously damaged heart who had been doing unbelievably well. Her exercise tolerance had been gradually worked up and she was looking robust and strong. Her mother broke her leg, leaving the work of a large family and invalid father and mother on her shoulders. She was admitted to hospital with a failing heart, broken compensation and died. Now in children, I think that most of these attacks of broken compensation in a previously badly damaged heart have with them a re-infection, and although all the foci had been cleanly removed so far as we could see, I think that this case was no exception. So that although at present we cannot say that having removed the focus of infection there is no danger of a re-infection, still our experience during the past two years as compared to previous years, when they were not so vigilant regarding complete removal of the faucial tonsils, has been so striking that it would certainly appear that this is a decided step in preventive medicine, and should be carried out as a routine in all cases in children having had symptoms pointing to chorea or rheumatism. We had a good many cases in the clinic at first with the tonsils supposedly removed, but on examination one found tags of faucial tonsillar tissue remaining. We have insisted that all these cases be cleaned up, and I should like to stress that point. We are not forgetting that the past two years have not been years in which rheumatism and chorea have been particularly virulent and that one's conclusions must be somewhat tempered by that knowledge, also we consider that there has been a good deal of luck in the comparatively few cases who have had recurrences of chorea because we believe, as does Lawrence of New York, that chorea is more apt to recur even after the removal of all the foci of infection so far as they can be found, than is the case when the infection manifests itself as rheumatism. However, with improved hygienic surroundings, which by the way I have not taken the time to discuss, and attention paid to the complete removal of all foci of infection in children, one has reason for hoping that we will be able to cut down very materially the incidence of heart disease which has replaced tuberculosis as the cause of the largest number of deaths all the year round in cities and country, and which has been estimated as the cause of one out of every fifteen deaths in North America.

CLINICAL AND BIO-CHEMICAL STUDY OF A CASE OF MUSCULAR WEAKNESS IN AN INFANT

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I. E. G. was born on Dec. 15th, 1921. The first named physician was called in to see this boy on Aug. 4th, 1922; the complaint stated by the parents being muscular weakness and retention of urine.

Patient's History.—The child had been vigorous in its movements in utero, and was born at full term by normal delivery, the mother being ill only about one hour. The birth weight was nine lbs., (as compared with 9.5 lbs. when first seen). The child had eczema in the first two months. The mother thinks that the child had not always been weak, but that the trouble was first noticed by her about the third month. He cut his first tooth at five months. He never had any convulsions, snuffles, mucous patches, glandular enlargement, nor enlargement of liver. When first seen, the spleen was not palpable, and there were no rhagades. There is no history of exposure to tuberculosis, and the parents are not tuberculous. This is the first child of healthy parents and there have been no miscarriages.

The mother stated that at three months of age the baby began to fail and lose weight, and seemed unable to pass urine in normal amounts, only urinating occasionally, and sometimes missing a day altogether. There was no history of indigestion, diarrhoea, bad stools, vomiting, nor anything that would lead one to believe that the child had any error of digestion.

Condition when first examined.—The child had been breast fed. Its abdomen was flaccid, and its bladder was empty. Catheterisation had not been used. The child was not in pain. Nursings were very short, consisting of only a few light tugs at the breast. The child seemed too weak to draw the milk, as there was an abundance in the mother's breasts. The inability to urinate seemed to be from lack of sufficient fluid intake, for the child only took water in very small quantities. For the same reason the child was constipated and the stools were of the small dark meconium starvation type; for this same reason the child lost weight.

On examination the child seemed absolutely listless, and his first appearance was one that suggested marked idiocy, which with the history already outlined made one think of amaurotic family idiocy. However, there was no Hebrew blood in either parent, and an eye-grounds examination did not give the cherry red spot at the macula, so that this diagnosis was discarded. He was so weak that he appeared blind, deaf, and his limbs paralytic (flaccid in type). The face had suffered the least in the disease and starvation. The child did not appear like a case of malnutrition, for his face was round and plump, and had not the pallor of atrophy. The limbs were not well developed muscularly. When the hand was lifted it fell listless, the legs similarly, and the head would have done likewise if allowed to do so.

There was no evidence of hydrocephalus. The head measured 17.5 inches, was round, and of good shape. The fontanelles were normal, the eyes were not oblique, there was no nystagmus. There were two teeth; the hair was fine and eyebrows not well developed; skin was soft and smooth, feet not markedly padded on soles but slightly at the heels.

Muscular system.—The muscles of the neck were unable to hold the head up. If the child was placed in sitting position it showed the *marked* kyphosis curve of weak erector spinae. There was possibly some atrophy of the leg muscles. There was no paralysis, spasticity, nor tremor. The child moved his arms more than the legs, but both a little. He did not grip with the hands. Lifting him by the armpits, the shoulders went up more than normal, but probably not so much as one would infer from pictures of muscular weakness in the texts. The joints seemed exceedingly flexible. The

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hands could fold over on the forearm to an angle of 35°. There was marked dorsiflexion of foot on tibia possibly to the same angle. No group of muscles showed hypertrophy.

All reflexes were normal. Dr. A. Gibson was kind enough to examine the electrical reactions, and his report is as follows: "I examined the electrical reactions of the muscles of W. E. G. In both the upper and both the lower limbs a normal reaction is obtained both to faradic and galvanic current."

An initial urinalysis showed its specific gravity 1.010, reaction acid, colour light amber, and no albumen, sugar, pus, deposits, casts, nor blood. The blood pressure was S. 90, D. 40, P. 108. The temperature was 98.3 per rectum.

Family History.—At the time of the child's birth the mother was 27 and the father 31 years of age; both were healthy and well. They were married two years before the first pregnancy, and this child is the product of that conception. There have been no pregnancies since.

None of the parents, uncles, aunts, grandparents, nor great-grand-parents showed any similar condition, nor any condition of muscular weakness whatsoever. The grand-parents are all living and in good health; the great-grandparents died of senility (6), or of accident (1), or infection (1).

Diagnosis.—The condition suggested the following possibilities: malnutrition, rickets, idiocy, poliomyelo-encephalitis, muscular dystrophies, or amyotonia congenita.

(a) Malnutrition.—This was probably a factor in the child's condition when first seen, because of lack of food, due to weakness of the muscles of suction. There was no evidence of an ordinary case of malnutrition.

b) Rickets.—There were no bony signs to be found anywhere.

(c) Idiocy.—This can be excluded as a cause of the weakness because the child presents a condition, since he has been getting a normal supply of food, which seems normal in mentality. He was not deaf, nor blind, as one would think at first examination, and although he smiled very little he followed objects with his eyes (but not with his head). His smiles were probably few for the same reason that he sucked feebly. He possibly showed signs of fear, and certainly some signs of trying to make his wants known, and also of likes and dislikes. His negative signs of mental development were probably signs of muscular weakness. Besides, if mentally defective, into what class does he fall? He is neither micro- nor macro-cephalic, nor a mongolian, nor a cretin, nor epileptic, nor paralytic, and does not present signs of the amaurotic condition. The condition is not idiocy.

(d) and (e) The absence of any acute illness in the past, the absence of spastic paralytic symptoms, and the normal reactions rule out poliomyelo-encephalitis. The presence of the knee-jerks shows that there is no peripheral nor lower neuron trouble, and since they are hard to obtain, and not accentuated, there would seem to be little the matter with the upper neurons. A paresis from poliomyelo-encephalitis is seldom so wide-spread as is the muscular weakness in this case; it never involves all the muscles of an extremity to the same degree, and is almost never symmetrical, as is the condition with this child. These factors also negative any of the ordinary muscular dystrophies.

(f) There would seem to be nothing left but amyotonia congenita, which this case fitted in every way from a clinical standpoint. However, amyotonia congenita is probably, as Crozier Griffiths says, a condition described which may be due to various factors, but which is certainly obscure at the present time. This study was commenced with the hope that it might throw a little further light on this disease.

Preliminary Treatment.—A physician who had seen the child a few weeks earlier had advised artificial feeding. When first seen by one of us it was put back on breast feeding. Since it was too weak to nurse, the breast was milked and the milk given by spoon. The child soon gained somewhat in strength, and nursed the breast fairly well, regaining its weight. In August, the weight was 9.5 lbs., in September, 13 lbs.; in October, 15 lbs. and on November 1st, 18 lbs., a trifle underweight, but almost normal.

At the first visit, after having made a complete examination, and a temporary diagnosis of amyotonia congenita, massage was ordered daily. This has been kept up continuously. The gain in weight seemed only due to restor-

ation of sufficient quantity of food, since the muscular condition did not by any means approach normal in November.

On November 1st the child was given cod liver oil, which has been continued since.

Preliminary chemical examination.—Two fairly complete chemical studies of amyotonia congenita have been made. That by Powis and Raper dealt with a girl aged 4 years, who showed marked increase in creatine, and decrease in creatinine excretion. There was also acholia, evidenced by fatty stools, though this

Date	*Period of Collection*	*Volume*	*Sp. Gr.*
		c.c.	
Oct. 28,	7 p.m.—10 a.m.	95	1.007
Oct. 29,	Afternoon	47	1.007
Oct 30/31,	24 hr.	(266)	1.0055
Nov. 13,	Casual	—	—

was not considered as definitely associated with the muscular condition. The second case, a boy of 3.5 years, described by Ziegler and Pearce, showed a similar abnormal creatine-creatinine metabolism, increased rest-nitrogen and neutral sulphur in the urine, and diminished chloride excretion.

These cases were both considerably older than the child under consideration. Gamble and Goldschmidt have given figures for two normal children (slightly underweight) of about the same age and weight as W. E. G. One, G., 10 months old, 6.5–7.0 kg., excreted on a cream, water and lactose diet 60-65 mg. creatinine, and 40-50 mg. creatine per day, and on a whole milk diet 80 mg. creatinine and 94-105 mg. creatine, the difference being traceable to the change in diet. The second child, M., 14 months, and 6.5 kg. weight, excreted on the first-named diet 68-72 mg. creatinine, and 62-64 mg. creatine per day. W. E. G., at commencement of chemical examination, weighed 6.8 kg. If this were a similar case of amytonia congenita we should expect to find creatinine below 60 mg. and creatine above 50 and probably above 60 mg. per 24 hours.

It may be mentioned here that with the very young children dealt with in this paper it has not been found possible to obtain complete 24-hours' urines, even when in institutions. In the case of W. E. G. it was impossible for the parents to afford institutional treatment or special nurses. They made the greatest effort to collect complete specimens, and these are certainly comparable. The loss was probably much less than 100 c.c., but this figure has been added to the actual amount obtained in each case, so that the figures are certainly maxima.

Analysis of a 24-hours' specimen of W. E. G.'s urine showed *much less creatinine than normal, but only a trace of creatine.* Incomplete specimens on various dates were fully in agreement. They are shown in the following table. There and elsewhere in this paper figures for creatine are expressed in terms of creatinine.

	Per 100 c.c.		*Total per 24 hrs*	
	Creatinine	*Creatine*	*Creatinine*	*Creatine*
	mg.	mg	mg.	mg
	16	1.5	—	—
	12.2	2.6	—	—
	17.7	1.4	47	4
	34	3	—	—

During these and subsequent examinations, sugar, albumen, and acetone bodies were invariably found absent. The urine was light amber in colour, of low specific gravity, and either neutral or slightly alkaline. There was frequently a sediment of phosphates. Toluene was used as preservative throughout.

With the results given in the table above may also be compared the following:

Gamble and Goldschmidt have published an observation on a four months, 4.5 kg. infant fed breast-milk, which excreted 46 mg. creatinine and 11 mg. creatine per 24 hours.

We have examined the urine of three fairly normal infants, on normal artificial diets. The first had been admitted to the Winnipeg Children's Hospital for acidosis, and had recovered under treatment, the second to the same institution for indigestion, and the third to the Winnipeg General Hospital for bronchial trouble.

L.M., 7 months, weighed 13.25 lbs. An "almost complete" 24-hours' urine specimen, 285 c.c., acid in reaction, with sugar and albumen absent, contained 55 mg. creatinine, and 24 mg. creatine. The diet contained 750 c.c. whole milk per day, estimated to contain 9 to 10 mg. creatinine and 10-12 mg. creatine.

J. M., 9 months, weighed 12 lbs. An "almost complete" 24-hours' specimen of urine (245 c.c.) contained 39 mg. creatinine, and 19 mg. creatine. The diet contained 450 c.c. whole milk, estimated to contain 5 to 6 mg. creatinine, and 6 to 7 mg. creatine.

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J. G., 16 months, weighed 20 lbs. A partial specimen (174 c.c.) of urine contained 60 mg. creatinine and 39.5 mg. creatine. The diet contained 750 c.c. whole milk.

While our normal figures are distinctly lower thon those of Gamble and Goldschmidt for children of the same age, they are still distinctly higher than those for W. E. G.

At a later date Dr. T. Ingvaldsen kindly measured for us the nitrogen partition on two 24-hours' specimens of W. E. G.'s urine, the first on a beef-broth and milk diet, the second on milk diet only.

	March 9/10		*March 14/15*	
Total N. in 5 c.c.	15.46 mg. = 100%		17.07 mg. = 100%	
Ammonia-N.	1.12	7.2	1.63	9.6
Urea-N.	10.55	68.3	11.45	67.2
Uric acid-N.	0.21	1.4	0.27	1.6
Creatinine-N. ...	0.40	2.6	0.47	2.8
Creatine-N.	0.62	4.0	0.002	..
Unaccounted for	2.56	16.5	3.21	18.8

The nitrogen-rest figures do not appear to be abnormally high. There have never been any fatty stools. *The chemical picture is quite different from that of cases of amyotonia congenita previously studied, showing on the contrary more marked diminution of creatine than of creatinine.*

Since it has been shown that the creatine content in muscle steadily increases from traces in the foetus to nearly maximum amount fairly early in extrauterine life, in the case of rabbits and chickens (Mellanby) and children (Rose), the perhaps unlikely hypothesis suggested itself that some part, or even the entire early store of muscle-creatine in young mammals might be derived from the diet, *i.e.*, the milk of the mother (birds have a very different creatine metabolism from mammals). The milk of the mother of W. E. G. was examined therefore on the off-chance that some abnormality might be found. Denis and Minot's method was employed, and controls were carried out with normal cow's milk as purchased, and with normal human milk. The results are given in the following table, and Denis and Minot's figures are added for comparison. (It is assumed that in their tables "creatine" indicates total creatinine plus creatine. If that is not the case their figures are distinctly higher than ours. In the following table "creatine" indicates actual creatine, expressed in terms of creatinine.

	Mg. per 100 c.c. milk		
	Creatinine	*Creatine*	*Total Creatine*
Denis and Minot, Cow I.....	1.35	0.95	2.30
" " II.....	1.40	1.00	2.40
" " III.....	1.50	0.90	2.40
B. and C., Cow's milk, Nov. 13.....	1.06	1.29	2.35
" " Dec. 2.....	spoiled	—	3.3
" " Mar. 26.....	1.6	1.8	3.4
Denis and Minot, Mother I.....	1.1	2.8	3.9
" " II.....	1.6	1.6	3.2
" " III.....	1.8	1.6	3.4
B. and C. Mrs. R. D., Mar. 23, '23.....	1.1	2.1	3.2
" Mrs. H. Mar. 26, '23.....	1.2	0.9	2.1
" Mrs. G. Oct. 31, '22.....	1.3	0.15	1.45
" " Nov. 13, '22.....	0.85	0.03	0.88
" " Dec. 2, '22.....	1.05	0.35	1.4

Cameron and Gibson have drawn the conclusion, from study of a case of muscular weakness in an adult man, and from the creatine-creatinine excretion in cases of amputation, that creatine is not formed in muscle tissue, but is absorbed by muscle and transformed to creatinine by some process involved with the carbohydrate metabolism of muscle and necessary for that.

Harding and Gaebler, from study of creatine-creatine metabolism in young children, have also drawn the conclusion that creatine is not formed in muscle.

It is evident that Mrs. G.'s milk contained very little creatine, and consequently as a potential source of creatine for the child it was negligible. The sample obtained on Nov. 13th was examined for other constituents, and appears to be normal as far as the examination went.

	Mrs. G.'s milk	*Normal figures*
Specific gravity	1.0296	1.028—1.034
Water	87.45%	87.5%
Fat	4.02%	2—4%
Lactose	6.7 %	6—7.5%
Protein (from N.) ..	1.8 %	1.5—0.7%

Her creatinine-creatine excretion showed nothing abnormal. A sample of urine obtained on November 13th, contained 156 mg. creatinine and 29 mg. creatine per 100 c.c.

Further treatment.—With the idea that the deficient muscularity of the child might be due to some defect in its power of creatine formation, and might perhaps be associated with continued creatine-deficiency in the diet from birth, from November 15th breast-milk was continued, but the diet was amplified by the addition of beef-broth. This was prepared by cutting half a pound of round steak into small pieces, covering it with water, and bringing the whole to the boiling point, then allowing to simmer for three-quarters of an hour and straining. As far as possible it has always been prepared in precisely the same fashion. It was analysed at various periods with the following results:—

Date	*Mg. Per. 100 c.c.*	
	Creatinine	*Creatine*
Nov. 28, 1922	77	76
Nov. 30, 1922	93	66
Mar. 10, 1923	70	177

The results of this treatment were apparently beneficial. The benefit might perhaps be related to other constituents of the muscle-extract fed, such as carnosine, but these have not been related to degree of muscularity, while the creatine-creatinine metabolism has.

Condition during this period.—During January, February, and March, 1923, the boy was definitely growing and gaining strength. He developed spasmus nutans, which was attributable to his condition, and the fact that he was living in somewhat dark surroundings.

At the end of the beef-broth feeding period (April) he was much stronger, could turn over in bed, kick strongly, and make an effort to get his feet under himself. The arms moved strongly and freely, and he could grasp the finger of the physician.

Further examination.—It was found impossible to establish any definite relationship between creatine intake and output. Thus on Nov. 29/30 the child excreted about 170 mg. creatinine and 45 mg. creatine, and obtained from 243 c.c. of the broth 226 mg. creatinine and 130 mg. creatine, in addition to the amounts from the breast milk. On Mar. 9/10 it excreted approximately 90 mg. creatinine and 140 mg. creatine. It had been weaned on Dec. 7/9, and the diet now consisted of 170 c.c. beef broth (containing 119 mg. creatinine and 300 mg. creatine) and 48 oz. "milk" (9 oz. cream, 13.5 oz. skim milk, 8 table-spoonfuls of sugar, and 25.5 oz. water, containing about 6 to 8 mg. each of creatine and creatinine). Much more creatine than creatinine is unaccounted for.

Even allowing for considerable loss, the volumes of urine collected from this patient and normal Winnipeg children of the same age were much smaller than usual. This is explicable by the extreme dryness of the atmosphere in Winnipeg during the winter months, and the consequently much greater insensible perspiration.

On March 12th the beef broth feeding was stopped. A 24-hour specimen of urine on March 14/15 contained approximately 100 mg. creatinine and only 4 mg. creatine. It appeared that the child was still incapable of manufacturing the normal amount of creatine.

This point was tested further and more accurately. On March 15th the child had been put back on the combined diet. This was fed for the last time on April 28th, and then only a diet of 48 oz. whole milk was fed. The urine was collected at intervals of a few days; the specimens were as complete as possible, a specially devised rubber urinal being affixed to the child, and the only loss occurred when some urine slopped over during the night. The figures are certainly comparable. They have been corrected approximately by adding 100 c.c. to each measured figure, and the results are considered as maxima.

Date	*Period on milk diet only days*	*Vol.*	*Total N.*	*Creatinine*	*Creatine*
		c.c.	*gm.*	*mg.*	*mg.*
April 28/29	0	(382)	3.1	121	398
May 2/3	4	(387)	2.5	96	50
May 9/10	11	(365)	2.5	63	39
May 14/15	16	(337)	2.3	67	21

The creatinine and creatine in the whole milk diet amounted to 15 to 18 and 18 to 20 mg. per 24 hours.

It is evident that there is a steady falling off in creatine excretion throughout the period,

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until ultimately the child is excreting as much as it receives in the diet, but no more. There is also a definite lowering in creatinine excretion, greater than could be accounted for from the previous diet. This is evident from the following data:

When creatine is fed to adult man in very large doses (20 gm.) it is completely excreted or destroyed within two or three days, and the same is true of creatinine (Rose and Dimmitt). Children apparently tend to retain both substances a little longer, though the excretion (and destruction) are apparently complete by the end of the third or fourth day after feeding (Gamble and Goldschmidt). The figures on May 2nd can therefore be considered as practically uninfluenced by the previous diet of beef-broth.

It would appear therefore that still, at the age of 16 months, W. E. G. cannot manufacture enough creatine for the muscle demand; when the outside store is cut off the muscle store is slowly deplenished, and the conversion to creatinine appears to fall correspondingly. It is to be expected that if the whole milk diet were continued there would be a decrease in muscle tone and strength.

The sample of urine on May 14/15 was examined further, and found to contain 0.71 gm. phosphates, and 1.85 gm. chloride (as NaCl). The phosphate excretion is normal, and the chloride excretion would appear to be even greater than that in the diet, since, according to Winter-Blyth the chlorine content of milk as NaCl is 0.1 per cent. corresponding to 1.2 gm. in 48 oz. of whole milk.

Condition of the child at the time of last chemical examination.—While, as above stated, at the end of the beef-broth feeding period, the baby was steadily growing stronger, on the contrary, on May 18th, there had been no further increase in muscular strength, but no definite conclusion could be drawn as to any regression.

Discussion of results.—It would appear evident that the child, for normal development, will require to be fed creatine (in beef-broth) continually.

It may be concluded with fair certainty that his condition is not similar to the only two cases of amyotonia congenita of which accurate chemical evidence is available.

Not only is the creatine metabolism different, but the nitrogen partition shows no particular abnormality, and the chloride excretion is certainly not lowered.

Further evidence of the dissimilarity of the two conditions is shown by consideration of Harding and Gaebler's "creatine coefficient." This, the combined creatine and creatinine excretion, expressed in terms of creatine, per kg. body weight, is practically constant for all ages, both for normal individuals, and for muscular dystrophic, hyperthyroid, and acromegalic patients, provided a high-protein, non-creatine diet be fed, and amounts to 22-24.

In the following table are included Harding and Gaebler's results for children between 2.5 and 3.5 years, Powis and Raper's case of amyotonia congenita, contrasted with two normal children on similar diet, Ziegler and Pearce's case, Gamble and Goldschmidt's figures for normal children on a low protein diet and our own case.

Subject	*Author*	*Age*	*Weight*	*Total N*	*Creatinine*	*Creatine*	*"Creatin. Coefficient*
			kg.	gm.	mg.	mg.	
Normal Girl, M.W.....	Harding-Gaebler	—	14.0	6.13	138	201	24
" H.C.....	"	—	14.0	6.78	145	164	22
Normal Boy, G.L.....	"	—	14.5	6.21	121	209	23
" V.D	"	—	15.0	6.85	125	232	24
" F.R.....	Powis and Raper	3 years	14	3.1	239	59	25
" G.L.....	"	2.5 "	14	4.34	192	81	23
	"						
Amyot. cong. Girl.....	"	4 "	9.7	3.73	67	118	22
" Boy.....	Ziegler-Pearce	3.5 "	13.35	2.98	95	93	16
Underweight C	Gamble-Goldschmidt	4 months	4.5	0.42	46	11	15
" S.....	"	8 "	5.4	0.50	56	12	15
" G.....	"	12 "	7	1.20	63	47	18
" M.....	"	14 "	6.5	0.84	70	62	23
Present case, W.E.G...	Brereton-Cameron	10 "	6.8	—	46	4	5.8
" "	" May 2/3	16 "	11	2.5	96	50	15
" "	" May 9/10			2.5	63	39	11
" "	" May 14/15			2.3	67	21	9

It will be noted that the cases of amyotonia congenita show less creatine excretion than the normal children studied by Harding and Gaebler on high protein diet, though compared with children on similar diets, their creatine excretion is definitely higher. But *their "creatine coefficient" is approximately normal.* Gamble and Goldschmidt's figures for younger children on low protein diets are lower, but are still definitely higher than those for W. E. G. on a slightly higher protein diet. The comparison emphasises the conclusion that *this is not a case of amyotonia congenita.*

Summary

A case of muscular weakness in an infant is described, in which the clinical symptoms present some likeness to those in amyotonia congenita, but the chemical examination negatives this possibility. The creatine and creatinine excretion are both much below normal, and the child apparently cannot manufacture the normal supply of creatine. Feeding creatine in beef-broth appears to improve the condition. When the beef-broth is discontinued creatine elimination falls rapidly, and the muscular development shows no further increase. The infant was breast-fed for eleven months (with a short interval of a few weeks during the eighth month). The mother's milk contained the normal amount of creatinine, but only a trace of creatine.

Methods used:

Urine.—Creatinine was determined by Folin's method, using an appropriate creatinine standard. The picric acid used was tested by Folin and Doisy's method, and found satisfactory. Total creatine was determined by Gamble and Goldschmidt's method, autoclaving for 30 minutes at 125° to 130°. It was found that addition of 2 to 5 c.c. of N/1 HCl to 10 c.c. of urine gave slightly higher values than 1 c.c. (as recommended by them), and the higher amounts of acid were used in the later determinations. The other constituents were determined by the standard methods described in Underhill.

Milk.—Creatinine and creatine were determined by the method of Denis and Minot. For lactose determinations proteins were precipitated by phosphotungstic acid as recommended by Myers. Comparison of this with the usual acetic acid precipitation, with cow's milk, indicates that the lactose values are about 10 per cent. too low.

Beef-broth.—Creatine and creatinine were determined by Hammett's method for muscle extracts, using appropriate creatinine standards.

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Ocular Disturbances in Pregnancy and during the Puerperium.—In four cases of neuroretinitis of pregnancy with marked albuminuria and marked reduction of vision that have come under his observation, Nelson M. Black, Milwaukee, found in each case extremely active infectious processes in the teeth and tonsils. Unfortunately, the damage to the eyes had already occurred, but improvement in the ocular condition, which in two cases was marked, and in the other two slight, did not take place until treatment was directed to the infected teeth and tonsils. Black suggests the advisability of making, during gestation, in additions to the early frequent examinations of the urine which is practically always done, a search for possible foci of infection, especially in the teeth, paranasal sinuses and tonsils, and correct morbid processes when found, rather than running the risk of allowing the patient to proceed to term with possibility of having to terminate pregnancy in order to save life or preserve vision. It is also suggested that visual examinations should be made, as a routine procedure, during the later months of pregnancy, with especial regard to the fundus and visual fields.—*Jour. A. M. A.*, Aug. 18, 1923.

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BIOPSIES AND THE COMPLETION OF CERTAIN SURGICAL PROCEDURES*

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Toronto

THE findings in a small but interesting collection of certain tissues removed for examination from living patients, seemed to warrant the presentation of a short paper with the heading of "Biopsies." The failure on my part to insist upon the procuring of a small slice of kidney during an operation for the removal of renal calculi, made me realize that even clinicians may have a responsibility in certain surgical procedures, and may be guilty of sins of omission.

Biopsies are a regular part of many surgical operations; the frozen section technique has proven itself invaluable; we have some, though fewer opportunities, to make such examinations in a medical service; opportunities are usually associated with glandular enlargements easily accessible and at times giving information of the highest import. Other biopsies, of more purely medical interest are the examinations of tissue fragments frequently to be found in bowel movements, in the washings from stomach or bladder, or in the fluids aspirated from chest or abdomen; without question, in many instances, a diagnostic detail is carelessly thrown away; a detail which would perhaps settle a doubtful point.

Of the glandular enlargements much has been said and written; much has also been discarded; enlarged and isolated glands in unusual positions demand excision and examination, and a case of generalized tumefaction in the glandular system will not escape our observation without leaving at least one gland for section; if it does, valuable clinical information may be lost and the final determination as to whether we are dealing with a Hodgkin's disease, a tuberculous infection, a lymphosarcoma, a leukaemia or a condition of metastasis may be quite impossible. Of the enlargement of glands in isolated positions and of their removal for examination a few words may be said. Metastases of malignancy may appear anywhere, but from new growths hidden in the body metastases to the supra-clavicular glands occur more frequently than to any other gland group on the surface. Proof of this may be seen in the rather varied nomenclature which an enlarged supra-clavicular gland may acquire,—Virchow's gland, Cabot's gland, Osler's gland, the Sentinel gland": no other of the superficial glands has been so honoured.

A few words only need be said upon the question of the completion of certain surgical procedures. A kidney can always suffer the loss of a millimetre of substance; the upper surface of an enlarged liver, away from intestinal contact, might spare a sliver; a unique observation is recorded by Umber[1] in 1912; while removing the spleen from a case of Banti's disease he was induced to take a small specimen from the much enlarged liver; the liver later returned to a normal size; the specimen had shown a distinct peri-lobular infiltration. A case of Dr. J. E. Elliott and H. A. Bruce is of equal interest: it is reported below.

It might well be questioned whether one should touch the pancreas unless a part of the gland has been actually exposed: a recently appearing article speaks strongly against such a procedure.[2]

Some lantern slides of tissues procured under various conditions may be better arguments in favour of biopsies than many words, and the following cases may be described and illustrated in support of the above statements.

Case 1. Plate 1.—Tissue found in stomach washings from a case of obstruction of the pylorus; referred by Dr. C. N. Mooney. On inspection the material resembled a piece of bacon fat but there had been no meat of any sort eaten for days. The history of the case is

*Read before the pathological section, Academy of Medicine, February 20, 1923.

that of ulcer of the stomach of twenty-five years standing: of late symptoms of obstruction with vomiting and rapid loss of weight, and the picture of the x-ray, have been in evidence. There was rapid improvement with gain of weight as a result of gastric lavage, and free Hcl was always present in large amounts in the stomach contents. The tissue, under the micro- suggests a fragment of a myxoma. There is

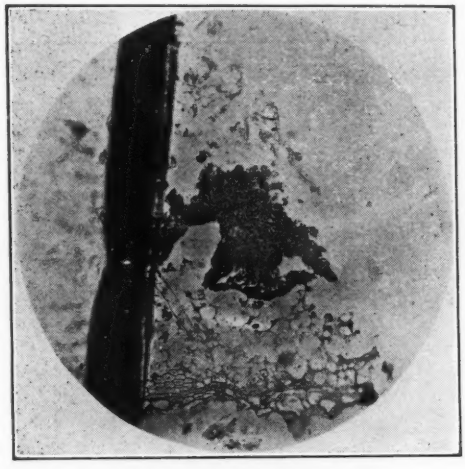

PLATE 1.

CASE 1.—Tissue found in stomach washings showing a myxoma-like structure and fibrin mass with leucocytic infiltration. Cases showing conditions not unlike this have been reported by H. B. Anderson and others. Conditions such as lipomatosis, fibromatosis and polyposis have frequently been met with, and if in the neighbourhood of the pylorus these tumour growths easily produce obstruction. The patient from whom this specimen was removed seems now perfectly well 1 year later, and has regained all of his weight.

also a little mass of fibrin containing leukocytes; there is some suggestive adenomatous structure; one would feel that the fibrin with the leukocytes would rule out any question of the tissue mass having been introduced into the stomach. The possibility of it being a fragment of a colloid carcinoma is to be considered.

Case 2. Plate 2 A.B.C.—Section of a gland tumour mass removed from the back in a case that had presented the symptoms and appearance of Hodgkin's disease. There had been general glandular enlargement reaching an extreme degree and eventually, blocking of the sinuses and naso pharnyx. A diagnosis of Hodgkin's disease affecting the naso-pharnyx had been made by Dr. Perry Goldsmith by whom the case was referred to me. With the remarkable enlargement of all the glands had occurred the picture of myelogenous leukaemia, there being a blood count of 300,000 white blood cells, with 40% myelocytes. The gland removed shows that the condition was neither Hodgkin's disease nor leukaemia, but a lymphosarcoma.

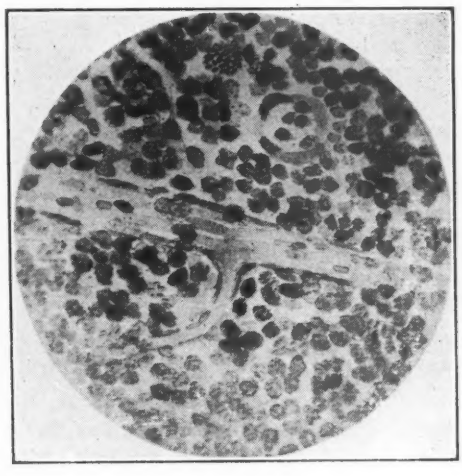

PLATE 2A.

CASE 2.—Section of gland showing complete transformation into lymphosarcomatous tissue.

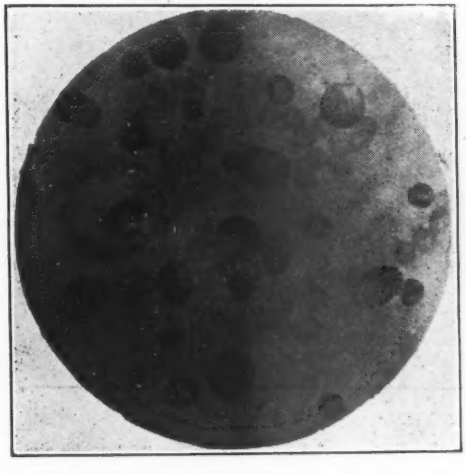

PLATE 2B.

CASE 2.—Myelogenous-leukaemia-like blood picture from the case of generalized lymphosarcoma from which the gland in plate 2A was removed. This is perhaps the only case on record in which a blood picture of this sort has been found in connection with generalized lymphosarcoma.

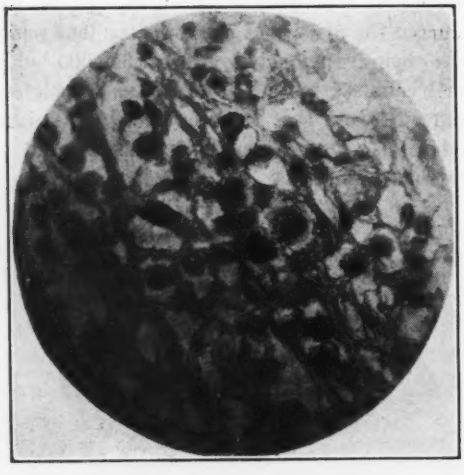

PLATE 2C.

CASE 2.—Gland from case of Hodgkin's disease for comparison.

Case 3. Plate 3.—Section of an enlarged left supra-clavicular gland, removed by Dr. Harris from a case seen with him and Dr. A. A. MacNamara. The history of the case was that of gastric distress for a year, (pain, burning, vomiting) and of late, laryngeal paralysis. Examinations, including x-ray pictures of the

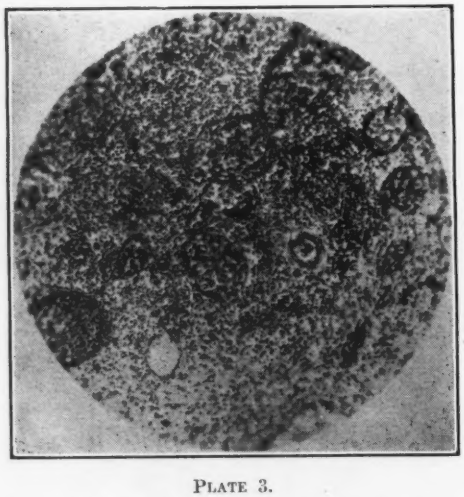

PLATE 3.

CASE 3.—Section of an enlarged supra-clavicular gland showing metastasis of carcinoma. In this case there had been marked gastric symptoms but there had been nothing suggestive seen in the x-ray examination of the gastro intestinal tracts.

gastro-intestinal tracts and of the chest had shown no evident gross lesion. A large supra-clavicular gland had been noticed by the laryngologist, no difficulty was experienced in removing the gland which shows the evidence of metastasis of carcinoma.

Case 4. Plate 4.—Specimen of a small slice of kidney taken during removal of seven stones from that kidney. The patient is still alive after fifteen years, a woman of 68. The specimen shows well the chronic glomerulo-nephritis and arterial change; particularly evident is the thickening of Bowman's capsule. The patient

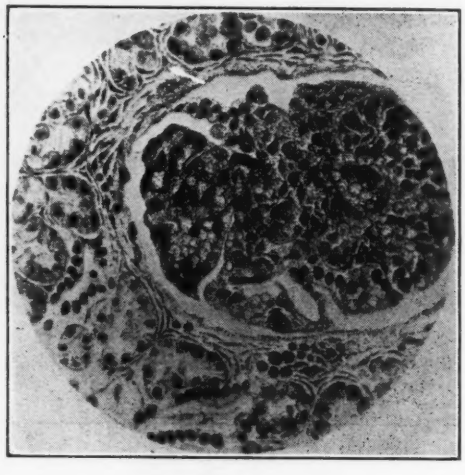

PLATE 4.

CASE 4.—A slice of kidney tissue taken during the removal of seven stones from that kidney. The marked thickening of Bowman's capsule and proliferation of the cells in the glomerular tuft is well shown. Patient, a woman of 68 years of age showing marked arteriosclerosis and a high blood pressure of 230-130 is alive and fairly well after fifteen years

had complained for years of abdominal pain with failing health, the appendix and right ovary had been removed, the right kidney had been stitched up to correct ptosis. There had been developing anginal symptoms; there was marked thickening of the arteries with a blood pressure of 280-160 m.m.; the patient was completely invalided and had given up her profession of medicine. Since the operation there has been slow gradual improvement, and in spite of the arterial condition she enjoys a comfortable existence.

Case 5. Plate 5.— Piece of tissue taken from a kidney during the performance of decapsulation. Patient had been incapacitated with general oedema which had lasted for nearly a year; there was an enormous amount of albumin in the urine and many casts. After the

operation the oedema disappeared and patient went back to work for seven years though never losing the albuminuria; he died as the result of a spreading cellulitis of the arm. The

PLATE 5.

CASE 5.—Section taken from kidney during the operation of decapsulation for albuminuria and severe general oedema. Complete transformation of glomerulus into amyloid. Patient from whom this specimen was taken lived and worked for seven years after his operation, dying eventually of a cellulitis of the arm. He never lost his albuminuria though the oedema disappeared at once.

specimen shows that the kidney was the seat of extensive amyloid disease, both kidneys had appeared the same at operation, and suggested the large white kidney of chronic glomerulonephritis. It was interesting to note that in spite of the enormous albumin loss, patient kept his weight and showed but a slight anaemia during the seven years in which he was able to resume his occupation.

Case 6. Plate 6.—Reported by the kind permission of Dr. J. E. Elliott and Dr. H. A. Bruce, and to be reported in full elsewhere. A case of unusual interest and value since removal of pieces of liver for examination has been rarely done. In this case there had been some obstructive jaundice which had been relieved for awhile by drainage of the gall bladder. On the return of the jaundice and progressive symptoms a year later, Drs. Elliott and Bruce were persuaded to anastomose the gall-bladder into the stomach since a chronic thickened

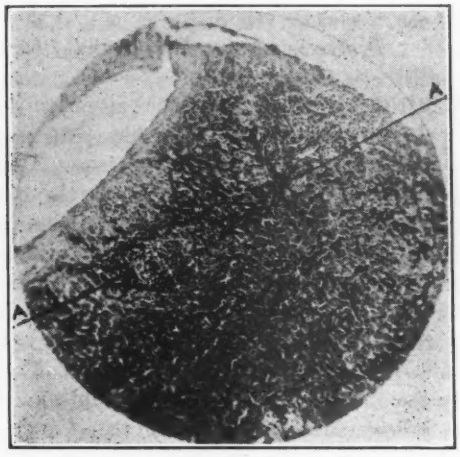

PLATE 6.

CASE 6.—Section of small piece of liver removed at operation of cholecyst-gastrostomy. Case of Dr. J. E. Elliott and Dr. H. A. Bruce detailed above. Perilobular infiltration is evident, and there are thickened areas in which dilated hepatic ducts can be made out as at points A. and A.

pancreas and occlusion of the common bile duct had been found. Before closing the abdomen a small section of liver was removed; following the cholecyst-gastrostomy which is now one year ago, the patient has improved to a remarkable degree. The section of the liver shows that the condition of obstructive biliary cirrhosis had developed as a result of the duct obstruction. The case is one of remarkable interest.

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(1) UMBER—quoted by Pearce, Krumbhar and Frazier, The Spleen and anaemias, *Munch. Med. Woch.*, 1912, LIX, 1473. ZEIT, *für. Klin. Med.*, 1904, LV, 789.
(2) DOWNES, *Journal of American Medical Association*, 10/2/23.

Incontinence of Urine after Childbirth.—Dr. Somerville draws attention to the value of electricity in this condition where the patients are much annoyed by the escape of urine from coughing or laughing or indeed on any sudden movement. After considerable experience of such cases Dr. Somerville commends a continuous current of 3 to 5 milliamperes passed for 3 to 5 minutes through an appropriate copper electrode introduced into the urinary canal and repeated on alternate days over a period of two weeks. The condition occurs also in unmarried women, and the same method of treatment is equally, and even more rapidly successful.—*B. M. J.*, Aug. 25, 1923.

XUM

THE PRESENT STATE OF OUR KNOWLEDGE REGARDING REJUVENATION

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DURING recent years much attention has been directed to operations of gland transplantation involving the testicles. These operations have been undertaken in the hope of removing disabilities incident to old age. The search for the fountain of youth is not new; it is not peculiar to our age and generation. Without reviewing the names and disappointments of the early seekers let us come at once to comparatively recent times. Probably the earliest attempt at transplantation of the reproductive glands was the work of Berthold[1] on fowls in 1849. He castrated cockerels and later transplanted gonad substance, coming to the conclusion that the development of secondary sex characters depended upon the testes. The work of Brown-Séquard is known to all. In 1889 he made extracts from the testicles of various animals and injected these into other older animals with apparently beneficial results. He then made an aqueous extract of dog's testicle and injected 1 cc. of this subcutaneously into himself. Extract of the testicle of a guinea-pig was also employed, and in all he received ten injections in a period of a few weeks. Brown-Séquard was 72 years old at this time and quite feeble. He states that from the time of the first injection he was much improved and that the beneficial effects were more pronounced after the others so that he regained the strength and ability to do mental work that had been his fifteen or twenty years before. He believed the spinal cord was the part particularly benefitted by the testicular extract.

Then follows an interval during which only sporadic work was carried out in this field. In 1912 renewed interest was manifested in the subject. The first reported transplantation in this country was by Hammond and Sutton[2] in that year. The work published at this time which attracted most attention was that of Steinach[3]. In this he cites experiments on young male rats resulting in the development of female sex characteristics and female mental attributes. The rats were castrated and ovarian tissue transplanted into them. He also discusses the function and significance of what he calls the puberty gland. These puberty glands are the interstitial cells of the testes and from Steinach's use of the word gland in connection with them there has been developed by the newspapers the term interstitial gland. The so-called interstitial glands do not exist as separate structures though it is possible that these cells and the germ cells, while anatomically associated, are functionally separate. Much that has been done since is based on this work of Steinach, who subsequently turned his attention to experiments on rejuvenation.

In 1920 he published a book[4] embodying his ideas on the subject and this has attracted wide-spread attention. Essentially his theory is that the sex gland increases in activity when the vas deferens is ligated. With increasing age the gland gradually loses its internal secretion. Steinach says the activity of the interstitial cells may be increased by the Roentgen ray, or by chemical means, but the surgical procedure of ligating the vas deferens is the simplest and most reliable. The blood vessels of the testicle must not be included in the ligature. Following the operation the germ cells atrophy, the symptoms of senility disappear and sexual desire returns. He states that the operation was performed on three old men in connection with another operation, that they did not know the purpose of the operation, and that in all three a good result was obtained.

Steinach's earlier work on transplantation of the sex glands has been confirmed by Sand[5] who states that special importance is to be attached to the interstitial cells in the testis, the

theca-luteal tissue and corpus luteum in the ovary. Of particular interest are experiments in which he succeeded by simultaneous implantation of ovaries and testes in infantile castrated animals, in producing ovo-testes with full spermatogenesis and production of ovarian follicles. The secondary sex characteristics in these animals were partially male and partially female. He regards the endocrine, not the exocrine, sexual gland as the fundamental sex structure. In another article the same author[6] gives an account of an operation on a dog over twelve years of age in which a vasectomy was done on the left side and a resection of the epididymis on the right. The result was that the dog was again able to accompany a bicycle rider, the condition of his skin and hair improved, and six months after the operation he had coitus.

Others reporting work on the same lines, viz., ligation or grafting, with corresponding results are Lespinasse[7], Moore[8], Voncken[9] Falcone[10], Stanley and Kelker[11], Lydston[12], Lichtenstein[13], Levy-Lenz and Schmidt[14] and Hunt[15]. Some of this work has been purely experimental upon animals; some of it has been upon human patients in an attempt to relieve some one or other of the conditions which such a procedure is claimed to benefit. There are differences in technique and in material used. In those cases in which gland transplantation was carried out, the source of the gland and the amount varied; sometimes the gland implanted in a human being was from a human source, sometimes from an animal, sometimes the whole gland was transplanted, and at other times only a portion. The location of the graft might be in the scrotum, on the peritoneum, or in the abdominal wall. The fate of the transplantate was frequently necrosis with sloughing and the discharge of a yellowish pus; sometimes degeneration and replacement with connective tissue; sometimes, but very rarely, the graft appeared to "take." Usually in the case of a successful graft the tissue, after some time, undergoes degenerative changes, and with the progress of these changes the sexual instincts diminish.

Moore[8] repeated Steinach's transplantation experiments and his statements are worth noting as showing a conservative attitude. He says that the apparent effects are not so marked as one is led to expect from Steinach's reports. Somatic changes due entirely to the presence of the implanted gland are difficult to demonstrate. From the psychical side the results are more definite—young male animals have been converted into apparently typical females and young females have been converted into such apparently mature males that they react psychically as males.

Stanley[16, 17] has later reported the injection subcutaneously of strips of fresh testicle taken from the ram, goat or hog, into man. At the time of his first article referred to above he had treated over three hundred cases with animal testicular material and now reports one thousand injections into six hundred and fifty-six patients. These include cases of neurasthenia, senility, asthma, epilepsy, paralysis agitans, dementia praecox, locomotor ataxia, impotency, etc., and as a result he states that such injections do have a decided effect on the human body. Among the beneficial effects he notes improved eyesight, increased appetite, increased energy, increased mental activity.

Liek[18] in a review of the work of Steinach commends it in general. He does not believe, however, that ligation of the vas deferens or x-ray treatment of the gonads will bring about rejuvenation. He points out that both these procedures have been carried out for other purposes but it has not been observed that the patients get younger. He believes that suggestion plays an important part in sexual matters.

Romeis[19] states that he saw a patient in whom sexual desire returned after an operation for hydrocele. Stutzin[20] calls attention to the fact that for many years the operation of ligating the vas deferens has been performed in cases of hypertrophy of the prostate and has not resulted in a restoration of the youth of the patient. Tiedje[21] in an article reporting the results of ligation on the testicle with special reference to the question of the puberty gland states that it has never been proved that the interstitial cells have an endocrine function and that there is not one reason to believe in a "Pubertätsdrüse."

It should be pointed out that while there has been much controversy as to whether the testis produces an internal secretion or not it is generally conceded that it does. Gley has stated

that to prove the point it is necessary to obtain from the blood the substance produced by the gland and to show that this substance will cause the same effects as the gland produces when functioning normally. The conditions here laid down have not yet been satisfactorily met in the case of the testis.

Meyer[22] studying the "interstitial sex gland" in women comes to conclusions the same as Tiedje. He says that an interstitial gland does not exist and that the word "Pubertätsdrüse" is without physiological meaning. A report of death following ligation of the vas deferens in a man with precocious senility, but otherwise healthy, is made by Mendel[23], who warns against this treatment. He also contends that neither the existence of Steinach's puberty gland nor the fact that ligation of the vas deferens between the epididymis and testis causes a rejuvenation of the interstitial cells has been proved. He regards transplantation of testicles as a more logical operation. Biedl[24], Kohn[25] and Fiebiger[26] do not agree with Steinach's teaching. Fiebiger is of the opinion that Steinach's results are not due to the operation but to cure of the scurf in the rats used.

According to Ishibashi[27] there does not appear to be a relation between the abundance of interstitial cells of the testis in man and the development of male sexual characters, nor is their hypertrophy necessarily associated with augmented functions of the parenchyma of the organ. Bolognesi[28] transplanted testicles showing hypertrophy of the interstitial cells and atrophy of the seminiferous tubules after removal of the vas deferens and epididymis into another animal. No change was observed in the animal receiving the implanted tissue, which degenerated into connective tissue. He concludes that the internal secretion of the testis is not derived from the interstitial tissue.

Summary

Such is the chaotic condition of the literature, making it exceedingly difficult to draw conclusions. There is no doubt that the sex glands exercise an influence upon development, especially of the secondary sex characters and indirectly, therefore, upon the organism as a whole. This influence is most easily explained by the hypothesis of an internal secretion, possibly produced by the interstitial cells, even if the existence and nature of such an internal secretion has not been proved satisfactorily. Attention has been drawn to the doubts which have been cast upon the rationale of Steinach's ligation operation. It produces, according to the originator, a pressure degeneration of the specific sex cells and hyperplasia of the interstitial cells. Might not the pressure produce reflexly such effects as described, increased sexual desire, etc., since in the normal individual similar effects follow accumulation of testicular secretion.

One of the unfortunate results attending the publicity that has been given this matter is the idea so widely entertained by the laity that any old man who has enough money to pay a young man to part with one of his testicles and to pay a surgeon to perform the operation of transplantation can have his youth restored; and, conversely, the old man who has not the money must grow old and die sooner than would otherwise be the case. Obviously such an operation, entirely apart from its merits, must be of very limited application. Though only one sex gland need be sacrificed by the person furnishing the organ, it is not easy to find men willing to make that sacrifice and to undergo an operation with its attendant dangers and suffering. Also, for the protection of the recipient the gland must be free from disease. It is true that some have thought that satisfactory results were obtained by transplanting testicles from other animals into man.

Sufficient time has not yet elapsed in the case of any type of operation to say that life has really been prolonged. The hope that is back of all such procedures is that the length of life may be increased thereby. All that has been accomplished up to the present, even in the opinion of the optimistic, is a revival of sexual desire and ability with possibly an improvement in the general physical condition. The fact that the patient expects certain benefits from such a treatment may account for some of the results obtained. Even those best able to judge admit the possibility of suggestion playing a part, and it is questionable whether it can ever be entirely ruled out. The question as to whether re-excitation of sexual activities is desirable or not is debatable. Lessening of these activities is one way in which

the body conserves energy and to re-awaken them may mean the expenditure of energy that is required to carry on the vital functions, or at least might be used to better advantage in this way so far as prolongation of life is concerned.

If the germ cells have ceased to function their function is not restored. The fundamental purpose of life is reproduction and when a living organism becomes unable to reproduce it is deteriorating and death is approaching. Man may prolong life beyond this point by various means—sanitation, medical treatment, etc. The interstitial cells of the testes do not give the ability to reproduce, except possibly indirectly by promoting sexual desire and ability to copulate, and it seems probable that the rejuvenation so-called is a pseudo-rejuvenation and that length of life is not prolonged.

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The Value of Egg Yolk in Rickets.—In view of the high content of fat-soluble vitamin in yolk of egg, and the close association in nature of this vitamin with the antirachitic factor, as best exemplified in cod-liver oil, it appeared worth while to A. F. Hess, to test the potency of the yolk in relation to its prophylactic and curative value in rickets. Rats were fed on a low phosphorus diet, as a basic rickets producing dietary, and to this diet 0.5, 0.3, and 0.25 gram of egg yolk was added daily. Experiments showed that egg yolk is able not only to protect young rats from rickets, but also to cure them of rickets. On the other hand they showed that white of egg is not merely devoid of antirachitic properties but seems to enhance the rickets-producing quality of a dietary. The yolk of one egg was added to the regular formulas of each of twelve infants, in the attempt to forestall the occurrence of rickets and the seasonal ebb of the blood phosphate. In most instances this addition was made in December, when the tendency to rickets becomes acute. By this simple supplement to the diet all the infants were protected from rickets as judged by clinical, x-ray, and chemical criteria. The percentage of inorganic phosphate in the blood, instead of falling to 3.6 mg., the ebb observed last March, was maintained at 4 mg. or more, a level encountered during the summer months. The calcium content of the serum also was unusually high. It seems evident, from these data, that yolk of egg possesses considerable protective value in rickets.—*Journ. Amer. Med. Assoc.*, July 7th, 1923, p. 15.

The Occurrence of Blastocystis in Intestinal Inflammation.—Kenneth M. Lynch, Dallas, Texas, records a case of acute diarrhoea of three months' duration in which *Blastocystis* occurred in small numbers and of small size in the passed stool, but in large numbers and in large, actively dividing form in preparations taken directly from cleaned rectal ulcers of unexplained origin, thus seeming to warrant suspicion of its connection with the ulcerative process. The organism was not obtained in culture in this case. In this instance it is worthy of note that *Endolimax nana*, although present in the stool, did not occur in the ulcers. —*Jour. A. M. A.*, Aug. 18, 1923.

XUM

COMPARISON OF QUANTITATIVE TESTS FOR SUGAR IN URINE

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DESIROUS of examining the practical value of various quantitative tests for sugar in urine, and of demonstrating a simple yet accurate clinical method, I entered upon a series of experiments the results of which are recorded in this article.

Taking the Benedict method as a basis for comparison, I extended my experiments to include the saccharometer fermentation test, and later, Pavy's method of estimation. A supply of urine from diabetic patients in the Winnipeg General Hospital has been available and the figures I obtained have shown a wide range of sugar excretion. These tests have led to a certain definite conclusion; namely, that the Benedict method, modified as I will show, is the best clinical way to make a rapid and reliable estimate of the total sugar present in a 24-hour specimen of urine. I wish to point out that this method has been suggested and used before, and my work has been entirely a practical demonstration of its usefulness.

As a preliminary step, Haines' solution was used to determine the presence of sugar by placing about 1 inch of reagent in a test tube, heating to boiling, and adding urine slowly from 1 c.c. pipette. If sugar were present a red precipitate of CuO was thrown down, and the amount of urine required thus indicated to some extent the concentration of sugar in the specimen.

This was followed by the original Benedict method, using 15 gms. crystalline sodium carbonate, talc. and 25 c.c. Benedict's reagent, boiling the mixture and running in from a burette, urine diluted up to 1 in 10 according to a rough estimate from the Haines test. Calculation was based on the fact that 25 c.c. Benedict's reagent are reduced by 50 mgms. glucose. This method is very accurate and the reagent keeps indefinitely. The principal objections to it are that there is a needless waste of material and that considerable apparatus is required.

The familiar fermentation test was next done. A small piece of yeast was added to 10 c.c. urine, well shaken, and the mixture poured into an Einhorn saccharometer which was left at room temperature for 20-24 hours. The sugar present fermented and the CO_2 collected in the tube was read off as percentage sugar in 24 hours. In my 36 experiments I did 25 fermentations and found this test to be quite unreliable. Ten tests gave no result whatever, only two were approximately correct, and the percentage errors in the remainder were roughly—

95%	21%	29%	79%	44%
36%	17%	35%	66%	..
38%	27%	72%	87%	..

or an average of 50%.

At first I kept the tubes at ordinary room temperature which in most cases goes down at night. This gave poor results, so I tried a well heated room which improved the results somewhat but still gave some negatives and low readings in the remainder.

Pavy's method proved quite effective and gave results which corresponded closely with those obtained by the Benedict test. A mixture of 20 c.c. water, and 20 c.c. reagent was heated to boiling and well diluted urine was run in from a burette until the solution turned colorless indicating the end point. The advantages of this method are:

(1) The solution is cheaper than Benedict's.

(2) The end point is clear and colorless.

(3) The reagent keeps indefinitely.

Objections to it are:—

(1) Fumes of strong ammonia are evolved by the boiling process.

(2) Considerable apparatus and time are required.

(3) A degree of skill is necessary to obtain the end point quickly enough, and yet accurately before the ammonia is boiled away and the consequent precipitation of CuO takes place.

Calculation was based on the fact that 10 c.c. of Pavy's reagent are reduced by 5 mgms. of glucose. This method is trying to the patience and often requires to be repeated because of the seemingly treacherous end point.

For clinical purposes my fourth method, a modification of Benedict's seems to me to be best since—(1) Little apparatus is needed. (2) It can be done in a few minutes. (3) Only 1/5 of the original quantities are used. (4) It is simple and reliable.

The test is done as follows:—A 24-hour specimen of urine is collected from the patient, shaken thoroughly, and a sample taken which should be tested within a day if possible. 3 gms. roughly, of crystalline sodium carbonate are placed in a test tube, with a little talcum to prevent bumping, and exactly 5 c.c. Benedict's reagent added.* This is held over a flame and kept boiling while urine is added drop by drop from a graduated 1 c.c. pipette until the blue color has entirely disappeared and a white end point obtained. With alkaline urine the end point is usually a brownish white. The reading is taken from the pipette and calculation made as follows: —

Suppose the 24-hour specimen is 2,000 c.c. and the pipette reading is 1.25 c.c. of urine. Since 5 c.c. Benedict's solution are reduced by 10 mgms. glucose, and since 5 c.c. Benedict's are reduced by 1.25 c.c. urine, it follows that 1.25 c.c. urine contain 10 mgms. glucose. Therefore, in 24 hours the total output of glucose in the urine is $-\frac{2000}{1.25}\times 10 = 16{,}000$ mgms. or 16 gms.

Expressed in terms of percentage the result would be $\frac{16}{2000}\times 100 = .8\%$.

My results for 36 tests in which I compared the original Benedict's method with the shorter test show that—

4 had a difference of 5-10 grms. in 24 hours.
3 " " " " 3-5 " " " "
10 " " " " 1-3 " " " "
19 " " " " less than 1 " " "

That is to say, 29 out of the 36 gave a result entirely acceptable for clinical work.

Total 24-hr. output .c.c.	*Benedict Burette gms.*	*Test tube gms.*	*Difference gms.*	*Fermentation gms.*	*Pavy. gms.*
2760	10.961	11.128	.167	neg.	
2640	41.904	36.164	5.740	33.0	
1950	10.263	10.000	.263	neg.	
1000	16.339	11.904	4.435	neg.	
1320	45.517	45.517	0.0	33.0	
1170	62.555	65.000	2.445	18.0	
855	7.077	6.679	.398	1.6	
2940	64.192	61.250	2.942		
4450	88.293	86.575	1.718	27.8	
4040	43.537	40.400	3.137	neg.	
1575	8.422	8.075	.347	1.0	
3770	16.348	15.643	.705	9.425	
990	33.000	26.975	6.025		
1620	15.758	16.822	1.064		
1680	28.668	31.100	2.432		
2520	21.017	21.724	.707	12.6	
1965	28.546	29.772	1.226	22.79	
1950	15.738	15.476	.262		9.535
1500	7.128	6.976	1.152	neg.	4.411
1800	4.306	4.390	.084		5.368
1650	7.093	7.819	.726		6.407
2040	5.124	5.469	.345		9.160
1200	15.113	14.814	.299		20.870
1755	4.594	5.433	.839		8.688
1850	22.478	23.591	1.113	14.8	18.781
1170	13.700	12.580	1.120		12.447
2865	96.790	86.818	9.972		88.153
1500	50.000	60.000	10.000		50.000
800	4.188	4.210	.022	neg.	3.864
1900	24.173	23.750	.423	neg.	20.765
1520	11.226	11.176	.050	7.3	10.555
1980	152.309	157.142	4.833	158.4	165.000
1200	9.884	10.000	.116	.48	9.523
1000	4.721	5.263	.542	neg.	4.366
1200	37.267	37.500	.233	40.32	32.000
1020	37.918	39.534	1.616	48.96	36.429

*Benedict's reagent can be obtained from Hynson, Westcott and Dunning, Baltimore, Md., or can be prepared according to this formula:

Cu SO_4 (cryst)	18 grms.
Sod. Carb. (cryst)	200 "
Sod. Cit. or Pot. Cit.	200 "
Pot. Thiocyanate	125 "
Pot. Ferrocyanide (2%)	5 c.c.
Dist. water to	1000 c.c.

Copper sulphate must be weighed accurately, and dissolved separately by aid of heat. The carbonate citrate and thiocyanate are dissolved together, ferrocyanide added, and then the copper sulphate.

Sugar Tolerance Testing.—It is recommended by Richard A. Kern and Leon Jonas, Philadelphia, that in sugar tolerance testing blood sugar estimations be made routinely just before one-half hour, one hour and two hours after a standard glucose meal. The curve of alimentary hyperglycemia may reach its maximum and return to normal within one hour after glucose ingestion. This is true in certain diseases, notably mild diabetes mellitus, as it is in normal persons. In order to differentiate such cases of mild diabetes from conditions in which there is a lowered renal threshold for glucose, it is necessary to determine the blood sugar percentage at less than hourly intervals. —*Jour. A. M. A.*, Oct. 27, 1923.

XUM

Case Reports

REPORTS OF TWO UNUSUAL CASES IN SURGICAL PRACTICE*

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Saskatoon

I propose to-day to present two cases under the title of this paper. The first case, that of a tumour of the spinal cord, does not occur very frequently even in large neurological centres. It does, however, undoubtedly occur more frequently than is generally supposed, many cases going down unrecognized to an inevitable fatal termination.

Intrathecal Tumour of the Spinal Cord.

Case No. 1.—F. G., a female, aged 26, a mother of 3 children, came under observation March 10, 1922, eleven days after giving birth to a healthy child.

Previous History.—The patient who is a very intelligent woman, states that her present condition began 3½ years previously, two days following the birth of her second child. At that time she was seized with a dull pain under her left breast along the ribs which lasted a few hours each day for a week. It then left her and returned again in a month. The pain became more constant, although part of the night was spent in comparative comfort. Walking or standing seemed to increase its severity. She was treated for neuralgia and rheumatism, and states she got considerable relief by taking small doses of aspirin. Her symptoms remained about the same for two and a half years; the pain then became bilateral with increased intensity and was most marked between the shoulder blades. Her legs would fall asleep when she sat in a chair for a few minutes. She required assistance in walking and had difficulty in controlling her limbs.

Present History.—Upon examination the patient presented the typical appearance of spastic paraplegia. When assisted, she attempted to walk with an extremely spastic gait. There was no atrophy of the limbs; the knee-jerks were exaggerated on both sides; and a marked ankle-clonus was present, especially on the left side. The plantar reaction was extensor. She refused to enter the hospital and returned to her home. Her condition became gradually worse and about May 1st, 1922, she was seized by a pain much more severe than usual which lasted twelve hours; when it passed off she noticed she was completely paralyzed from the waist down. After this time the pain was of the girdle type above the umbilicus, was not so severe, and did not last so long. Upon admission to the hospital, May 16th, she presented the typical picture associated with a transverse lesion of the cord. She had anaesthesia below the 10th dorsal segment, and had lost control of bladder and bowel.

In arriving at a diagnosis trauma, tuberculous disease of the spine, and syphilis were excluded, and the diagnosis of a tumour of the cord was made. On May 20th, laminectomy was done under ether anaesthesia; the 7th, 8th, and 9th dorsal laminae were removed and the tumour and cord exposed.. The pulsation of the cord was normal above the tumour and entirely absent below. The tumour, which was about the size of a walnut, was removed without difficulty although it extended along the nerve root for some distance into the intravertebral foramen, between the 7th and 8th dorsal to the left side. After removal of the tumour normal pulsation returned along the whole length of visible cord. The tumour was described in the pathological report of Prof. Lindsay as "Gliosarcoma."

Tactile sensation began to return the second day following the operation, and on the 7th day the patient was able to move her toes. Periodical attacks of pain returned with great intensity, radiating down both legs, and lasting from half to one hour every six to eight hours. Anaesthesia was replaced by hyperæsthesia so marked that the slightest touch of the cutaneous surface would cause excruciating pain.

Upon discharge from the hospital, July 21st

*Read before the Alberta and Saskatchewan sectional meeting of the American College of Surgeons, Edmonton, September 15, 1923.

the patient was taking from 3 to 4 grains of morphine hypodermically. After returning home she gradually regained motor power, the attacks of pain gradually grew less. Control of the bladder became normal about the 7th month after the operation. The bladder, however, remained very irritable, and she was readmitted to hospital June 21st, 1923, when we improved this condition by removing a stone the size of a large almond. At the present time she has no pain, does not require morphine, and is able to walk with the assistance of a cane. Her reflexes are, however, slightly increased.

With regard to the diagnosis, I wish to emphasize the essential feature of the clinical history: pain long precedent to paraplegia characterized by remissions and varying in intensity.

Post-operative Tetany with Implantation of Human Parathyroids.

Case No. 2.—E. M., a female, aged 27, was admitted to the hospital February 1st, 1923.

Previous History.—Shows that she has had no serious illness, she is the mother of two children, the youngest 3 years old; she had no complications or symptoms of tetany with either of her previous pregnancies.

Present History.—For the past year she has suffered from well-marked exophthalmic goitre with exacerbations and remissions. She became pregnant two months prior to admission, which resulted in an exacerbation of the disease. Her condition on admission showed marked tremor, a high degree of exophthalmos, and a pulse rate ranging from 120-160, with marked gastro-intestinal symptoms, vomiting and diarrhoea. With absolute rest in bed and usual treatment these symptoms abated considerably. The pulse rate dropped to 100-110, and the tremor and gastric symptoms improved.

On March 7th, ligation of both thyroid arteries was done with the patient in her bed under nitrous-oxide gas analgesia combined with novacain and followed by infiltration of quinine and urea hydrochloride. Very definite improvement followed and in three weeks' time, March 27th, double lobectomy was performed, using the same combination of anaesthetics, the patient being anaesthetized in bed before being taken to the operating room. The operation consisted of excision of the upper 4/5ths of both lobes and the isthmus leaving the posterior and lower portion *in situ*, attached to the inferior thyroid arteries.

There was nothing unusual post-operatively until the morning of the 3rd day when the patient began to show very definite symptoms of tetany, and complained of numbness and twitching. These symptoms increased rapidly. During the next 24 hours the fore-arms became flexed at the metacarpo-pharangeal joints and held rigidly in adduction, the thumbs were drawn into the palm. The legs were straight and stiff with the toes in plantar flexion. Chvostek's sign was present. The rigidity of the limbs was constant with periodical twitching of the muscles of the face. 30 grain doses of calcium lactate were given every 4 hours for 6 doses which seemed to improve the patient considerably.

On April 1st, the 5th day following the operation, the inferior parathyroid glands of a boy 10 years of age, accidently killed, were transplanted beneath the pectoral muscle of each breast, special care being taken to free the graft bed from fat. The glands were obtained and inserted within 4 hours of the boy's death. The wounds healed by first intention.

The dose of calcium lactate was reduced to 10 grs. twice daily and discontinued in six days. By the 5th day following the insertion of the parathyroid glands, the symptoms were very much improved and continued to disappear until she was discharged 10 days later without a single symptom of tetany. At the present time she informs me she has never felt better in her life, her general condition has improved, the exophthalmos is reduced considerably and Chvostek's sign is absent.

With regard to the treatment of post-operative tetany following the removal of the parathyroids, it is generally conceded that the only hope lies in successful transplantation of parathyroid tissue. It is difficult to explain the onset of tetany in this case. Was it brought about by the complete removal of all functioning parathyroid tissue at the time of operation? or was it due to a temporary cessation of function as the result of operative trauma? At the time lobectomy was performed the patient was four months pregnant. McCallum claims that tetany occurring in pregnancy is due to the

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loss of calcium supplied by the maternal body in building up the foetus. It is hard to conceive that the four months foetus would deplete the body to that extent. So great an authority as Mr. James Berry of London, declares in the British Journal of Surgery, April 1921, that tetany only occurs in total thyroidectomy because no thyroid substance is left and that the thyroid and parathyroid tissues are identical in function. Such teaching if followed will sooner or later be associated with disaster. One should not disregard the possibly separate function of the parathyroids, and in operating one should adhere to the principle of "safety first" as their removal may undoubtedly be followed promptly by tetany.

Treatment of Xanthoma Palpebrarum with Finsen Light. — S. Lomholt (*Ugeskrift for Laeger*, May 31st, 1923, p. 390) notes that as xanthoma palpebrarum is a perfectly benign and painless growth, doctors are seldom called on to treat it, although in his experience it is a very common condition. From the cosmetic point of view, however, it is a serious condition, and at the Finsen Institute in Copenhagen the usual practice adopted in these cases up to the spring of 1922 has been to give radium treatment. But this treatment proved tedious, and better results have recently been achieved with concentrated carbon arc light applied in the same way as for lupus. A single exposure of about one hour was in some cases repeated three or four times, a certain interval being allowed between each exposure for the reaction to subside. At the Finsen Institute 11 cases have recently been treated in this manner, and the results have been very good. The yellow patches disappeared completely, or almost so, and without the formation of any scar. Only in a few cases there was a slight pigmentation left in the periphery of the area treated, and it should be noted that such pigmentation may exist before treatment. Provided the first course of treatment is adequate, there seems little chance of relapses *in situ*, but this treatment does not, of course, prevent recurrence of the disease in new areas. The author concludes that even in the tuberculous form of the disease, Finsen light is superior to any other form of treatment.—*Brit. Med. Jour.*, Aug. 11, 1923.

Diagnosis of Lead Poisoning.—A. Feil and R. Heim de Balsac (*Paris méd.*, May 26th, 1923, p. 463), after examination of 179 workmen employed in factories where lead was used, came to the following conclusions with regard to the value of the various clinical signs in the early diagnosis of plumbism: (1) Some signs are of real value, such as the blue line on the gums, which is the most frequent and earliest manifestation. It was present in 65 per cent. of 96 workmen engaged in an accumulator factory, and was also found in 65 per cent. of 83 carriage painters. In 25 per cent. the blue line was very distinct, and in 40 per cent. faint. Most of the workmen with the blue line also showed red cells with basophil granulations, but in about one-tenth of the cases only one of these two signs was present at a time. In 5 to 6 per cent. of the cases lead colic was an initial sign, being found in 7 per cent. of the workmen in the accumulator factory and in 6 per cent. of the carriage painters. Parotitis was found in only 3 out of 97 workmen, and therefore possesses less diagnostic value. (2) The other clinical signs, such as myalgia and arthralgia, rise of blood pressure, and gout, do not possess any specific character, but are late phenomena. The same may be said of nephritis, anaemia, paralysis, and tremors, which all indicate profound and old-standing systemic intoxication. (3) With the exception of the blue line, clinical signs are too often absent at the onset to justify waiting for their appearance before starting prophylactic treatment. Laboratory methods, therefore, such as search for red corpuscles with basophil granulations, and examination of the urine for lead, should be chiefly relied on to prevent plumbism in workmen engaged in factories where lead is employed.—*Brit. Med. Jour.*, Aug. 4, 1923.

Editorial

PROPOSED BANTING MEDICAL RESEARCH FOUNDATION

IT is difficult to realize at such short range just how important an influence the work of Dr. Banting and Mr. Best has been in stimulating medical research in Canada, and indeed throughout the civilized world; but it seems likely that history will view the discovery of insulin, not only as a valuable contribution to the science of medicine but of peculiar significance in as much as the efforts of several ancillary sciences were focussed upon its discovery. In a peculiar way, therefore, the work of Banting and Best represents medical research at its highest. So far as Canada is concerned we may be forgiven our special pride, in that our own sons, in our own country, have produced something so worthy of the noblest traditions of our calling, and, that their discovery was given freely to the whole world. We are well aware that Canada has produced many exceptional men of science, but only too many whose contributions have brought renown alone to the countries of their adoption, rather than to the land of their education and birth.

Anything, therefore, which promises to foster native talent, to facilitate good work "at home" surely merits our approbation, and for this reason, if for no other, we welcome the announcement of a plan for the establishment of the Banting Medical Research Foundation. In brief, an attempt is to be made to collect a sum of one million dollars in Canada, Great Britain and the United States, with the avowed intention of encouraging medical research in this country. The appeal is to be made on account of the free gift of insulin to the world for the control of a dread disease and all that that means in the prolongation of human life, and the alleviation of human suffering. An indication of the amazing financial benefit of insulin in one direction only, is to be found in an estimate of one large insurance company of the United States, namely: that, should insulin prolong the life for one year of the diabetics insured in this one company, it would mean a gain of $2,000,000; and surely the humanitarian phase of such an appeal should measure even larger in the minds of all generous people in the world.

It may be said that the universities of this country provide ample facilities for work, and this is largely true; but is not a consideration worth while of the possible influence of something more? For example, should this research foundation emerge into a life of full activity, any man or woman possessing sufficient training and ability to think out some new method of investigation of value, as Banting himself did, would there find help and guidance in the fulfilment of his or her desire for purely medical research, or research in such related subjects as Physiology, Pharmacology, Biochemistry, etc. Surely this is the much desired democratization of Research, such as is found in the Pasteur, Lister and Rockefeller Institutes of other countries.

The general plan of organization and the launching of the appeal for funds is in the hands of a small committee composed of: John W. Rogers, Esq., Toronto, *Chairman;* George David Stewart, M.D., President of the New York Academy of Medicine; J. G. Fitzgerald, M.D., Professor of Hygiene and Preventive Medicine, University of Toronto; George W. Ross, M.A., M.B., M.R.C.P., Toronto; John A. Stewart, LL.D., Executive Chairman Sulgrave Institute, New York. Edwin L. McCormich, Esq., Toronto,

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has been appointed as secretary. Whatever money is collected will be transferred to another committee, composed of leading citizens of this country, whose duty it will be to organize the institution on a permanent basis.

THE ETIOLOGY AND TREATMENT OF SHOCK

AT the recent International Congress of Surgery an interesting discussion took place on the subject of shock, its cause and its treatment. The subject was introduced in a paper by Crile, of Cleveland, who regarded the body as an electro chemical mechanism, and interpreted the symptoms met with in shock on that hypothesis. Dr. Mocquo, of Paris, stated that the prognosis of traumatic shock might be calculated by the central temperature, the determination of the arterial tension and by analysis of the urine and the blood. The recovery of the urinary function, a discharge of urea and the diminution of blood urea content were the best signs of a favourable prognosis. Mr. Fraser, of Edinburgh, referred to the many theories which had been propounded as to the cause of shock. Crile and Mummery had argued that sensory stimuli produced a rise in blood pressure from the irritation of the pressor nerves, but finally exhaustion of the vasomotor system took place followed by dilatation of the peripheral vessels and a fall of blood pressure. Yandell Henderson, in his acapnoea theory assumed the sequence as follows: hyperpnœa, acapnœa, failure of the vasomotor pressor mechanism, fall of blood pressure, and possibly a secondary concentration of the blood. Meltzer believed that the stimulus of injury resulted in an inhibition of the functions of the spinal cord. All these theories had been shown to be based on defective observations and were, therefore, erroneous.

An intense investigation of the conditions existing in shock was undertaken during the great war. At the present the most that can be said is, that shock is a state of depression of all the vital functions of the body, this state being primarily induced by the infliction of severe injury on the body tissues, and being characterized by a progressive fall of the blood pressure. The problem still is to explain this progressive fall. He regarded the other symptoms as secondary to this one. In health there were three factors maintaining the blood pressure, the heart, the vasomotor mechanism, and the blood stream. It had been shown that there was no interference with the nervous mechanism of the heart even in profound shock. Mann had shown that apart from myocardial disease an efficient contraction of cardiac muscle can be guaranteed as long as the heart is properly supplied with blood. In reference to the vasomotor mechanism Malcolm and others have asserted that the vessels are actually contracted during shock, and all the evidence supports this probability. It has been shown, however, that when shock is established the blood volume in actual circulation is reduced. The cause of this reduction is uncertain. Shock has been called by Cannon, "The problem of the lost blood." The practical surgeon knew that the blood was not in the splanchnic vessels, which are contracted under deep shock. There apparently existed a capillary stagnation; respiratory, motor and sensory disturbances were all accounted for by a low arterial pressure. Nervous causes, the influence of the absorption of toxic products, cold, internal secretions, anaesthesia, haemorrhage and sepsis, all might play their part in inducing this condition. With the great lowering of the blood pressure and the deficiency in the circulating blood a series of events occurred leading to derangement of the body metabolism and deficient oxygenation of the tissue, and this in turn increased the capillary stagnation. Treatment should follow well known lines. The patient must be kept warm. In-

take of fluids may help to maintain the blood pressure. Sleep is all important, but morphine should be used carefully. Adrenalin, strychnine, alcohol, and pituitary extract are of little if any use. Glucose and sodium bicarbonate are of value if acidosis was present. Transfusion of blood gave the best results.

Pauchet, of Paris, said that the transfusion of pure blood was on physiological grounds superior to the transfusion of citrated blood, but the latter was easier to perform and could be more widely used. If blood was obtained from the donor in an atmosphere of oxygen, venous blood became transformed into arterial blood of which the action was especially efficacious. Blood, unlike saline, did not filter through the capillary walls. Pauchet thought that the reason why blood transfusion which in his opinion was the ideal treatment for shock, had not been more widely used was due to the lack of a systematic organization for its employment in every hospital. Every unit in a hospital, surgical, gynaecological and medical, ought to be provided with a special service for this purpose.

ON EXCESSIVE MAGNIFICATION OF SPORT IN A UNIVERSITY

THERE is a fine passage in the writings of the late Dr. Maudsley, in which he reflects on the breaking down of the mental powers. "It is not for the most part that brains wear out in old age"; he says, "many times they would go on longer if they were properly fed with energy from below, but the organic functions decay and fail; it is their failure which causes desire to wane and the grasshopper to be a burden; they are the sources of life's energy and relish, and in their integrity and vigour lies the secret of a fresh and active old age."

The preservation of these functions is ever before the mind of the teacher; it is on this principle that games have been developed and fostered so generously. But what if in the end there is no brain worthy of being fed? What if the care of the organic functions is allowed to encroach on the development of the mental powers? In other words, is a university training to aim chiefly at the nurture of the mind using games as an aid, or is the capacity to excel in games to become an end in itself, with the mind left unstocked and undeveloped. Perhaps that is stating the matter with exaggeration; perhaps even there is no such problem, and the real objects of the university are well enough understood by all students. But, then, what of the specialized training nowadays for such a game as football; the expensive coach, the rigid drilling in cryptic formations, the undeniable sacrifice of time supposedly belonging to the laboratory or classroom. Does this magnification of sport not enter into the life of the student footballer so much as to encroach on the intellectual side of his growth? Some idea of the intensity of the training is gained when we hear that it is necessary to arrange for special relaxations, such as theatres, to counter-balance its effects.

One may never fear that football or any other sport will become a primary object in a Canadian university, but one may observe with a jealous eye the indisputable growth of the part that sport is allowed to play in the life of the student who is fortunate enough, perhaps, to possess the gift of fine athletic powers.

ABRAM'S THEORY

ENQUIRY from a member of our Canadian Association as to the validity of Abram's claims for his "theory" and for his diagnostic and therapeutic machine has been received. The assertion is made by our correspondent that members of this Association are using these methods for the treatment of disease and

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are obtaining large fees thereby. If this be so, and if they have a conviction that the treatment is sound and of benefit to their patients we are of the opinion that reports of cases thoroughly investigated and proven should be given by them to this *Journal* for publication.

For our own part we have no first-hand knowledge of Abram's own writings and have nothing on which to base an opinion but the statements of lay writers in popular monthly magazines published in the United States. From these it would appear that Abram's theory is based upon the belief that all disease is predisposed to and grafted upon hereditary syphilis, which disease is common to all civilized mankind to whom it has been transmitted from the lower animals, *i.e.*, the calf, in the procedure of vaccination. Furthermore, it is stated that the blood of an individual has a certain electrical activity, even when old and dried and dead, and that with his machine, Abram, or those in possession of it, can diagnoses the presence and the severity of such diseases as syphilis, tuberculosis, cancer, etc.; and not only the severity expressed in percentages, but the actual location of the disease.

Naturally such assertions, contrary to all scientific and accepted belief, have deterred the serious minded from investigation, comment or criticism. But in fairness to our correspondent we cannot ignore his question nor his statement, and our opinion is expressed forthwith, "that the use of Abram's machine by members of the medical profession, other than for the purpose of investigation and experimentation, is unjustifiable and unethical; and that exploitation of the machine for personal and financial gain is gross quackery and fraud. We are open to correction and conviction, not from vituperative abuse and declarations in the lay press but from carefully prepared reports from members of our own Association, who consider themselves justified in the adoption of Abram's methods."

The Cult of Abrams and the Scientific American.—The "Electronic Reactions of Abrams" are being investigated by the *Scientific American*. While THE JOURNAL is still of the opinion, expressed several times, that the whole scheme is so preposterous a fake as to stand self-condemned, yet, there are, presumably, some people who demand demonstrable evidence of the fact that the moon is not, and never was, made of green cheese. A preliminary article regarding the investigation to be undertaken by the *Scientific American* appeared in the October, 1923, issue of that publication. The first test to determine the accuracy of the "Electronic Reactions" diagnosis is reported in detail by the managing editor of the *Scientific American* in the current (November) issue. It makes amusing reading. Six tubes of pure germ cultures were submitted to an Abrams disciple with the request that he identify the cultures. The first tube was a pure culture of typhoid. The Abramsite diagnosed it as "acquired syphilis, congenital syphilis, tuberculosis, gonorrhea, pneumococcus, malaria and influenza" but failed to diagnose typhoid. The second tube was a pure culture of pneumococcus. The "ERA" ("Electronic Reactions of Abrams") gentleman diagnosed the contents of this tube as "congenital syphilis, tuberculosis, gonorrhea, malaria, influenza and colon septecemia" but did not find what it really was, pneumococcus. The fourth was a tube containing a pure culture of tetanus. It was diagnosed as "malaria, influenza, colon septecaemia and diphtheria," but not tetanus. The sixth culture was of diphtheria. The Abrams wizard found "congenital syphilis, tuberculosis, gonorrhea, pneumococcus, malaria and colon septecemia." And so it went. When the Abrams disciple found that he was falling down hopelessly he began casting around for excuses. Looking at the vials which he had already tested, he discovered for the first time that the labels had red edges and bore blue handwriting. This catastrophic chromatic combination, naturally, shot the "ERA" all to pieces. The disciple explained how, quite recently, he had obtained very unsatisfactory results all one morning to find later that the cause was due to his "subject" (the healthy individual whose abdomen is percussed) having a piece of red cardboard, a theatre seat check, in his trousers pocket. However, the *Scientific American's* committee removed the red bordered labels with the blue handwriting and substituted a set of plain labels prepared on the typewriter; but the diagnostic results were no more satisfactory than before. It may be said in closing that Albert Abrams has disowned the disciple who flunked the tests as not being a Simon Pure hundred percenter and has promised the *Scientific American* to give a personal demonstration "some time in the near future, if time permits." The whole thing is very funny and very foolish.—*Jour. A. M. A.*, Oct. 27, 1923.

Editorial Comments

The Department of Health, in Ottawa, has printed a very useful pamphlet of 27 pp. on "Sanitation, with special reference to Sewage Treatment for isolated houses and small institutions where municipal sewage system is not available." The article is written by B. Evan Parry, M.R.A.I.C. It is clearly written, well illustrated, and will certainly prove of great usefulness to those who have to deal with the disposal of sewage in isolated houses throughout the country.

The "Endocrine Survey" has been received and purports to be a monthly review of progress in the study of endocrinology and organotherapy. The editor is Henry R. Harrower. It is emphasized that this journal is not connected with nor published by the Harrower Laboratories in California, but by a separate company.

We are receipt of a small pamphlet published by the Ontario Provincial Board of Health, containing information for physicians on "The use of insulin" and its method of administration, and naming the various depots at which it may be supplied free of expense, for use in patients who are unable to pay for the drug themselves. The pamphlet has been prepared by Dr. J. W. S. McCullough, Chief Officer of Health, and gives all the facts important for the physician to be acquainted with.

In a letter received from Messrs. Parke, Davis & Co. they call attention to the fact that in a recent Editorial the specific term "pituitrin" was employed when the intention of the writer was the inclusion, speaking generally of all extracts of the posterior pituitary gland. Messrs. Parke, Davis & Co. state that they have the exclusive right to the use of the name pituitrin for their preparation which is standardized by the employment of both pressor and oxytocic tests, and to prevent deterioration each package is dated. They claim that some of the untoward results reported in the press were not the result of their preparation, but of imperfectly standardized extracts made by other manufacturers. We desire to acknowledge that our use of the term "pituitrin" as including all pituitary extracts was unfortunate, and we regret if any slur whatever was cast upon the standardized preparation made by the well known firm in Detroit.

THE FREQUENCY OF CHLOROSIS

In the July issue of Guy's Hospital Reports, an article appears by Dr. J. M. Campbell, on the subject of "Chlorosis," which was at one time so prevalent in many civilized countries. This disease is stated to be rapidly disappearing under the greater amount of exercise and the more ready access to fresh air enjoyed by the young women of to-day. The percentage reduction in chlorosis as observed in Britain so far as figures can be collected is shown in the following table:—

TOTAL BRITISH FIGURES OF CHLOROSIS—PERCENTAGES

Year	Percentage cases	Year	Percentage cases
1898.....	6.6	1908.....	5.9
1899.....	5.4	1909.....	4.9
1900.....	5.6	1910.....	4.2
1901.....	6.7	1911.....	4.4
1902.....	8.0	1912.....	4.2
1903.....	8.5	1913.....	2.8
1904.....	6.8	1914.....	3.1
1905.....	6.5	1915.....	2.5
1906.....	5.1	1916.....	1.8
1907.....	5.5	1917.....	1.5

A similar decline in frequency has been observed in Sweden, in France and in America. Chlorosis is considered to be an exaggeration of a normal condition rather than a definite disease *sui generis* and the inference is perhaps justified that the general health of womanhood under this greater amount of exercise has gradually improved from about the beginning of the present century. It was about this time that the first insistent demands for an outdoor life and regular exercise for school girls and even adult women began to be made. Dr. Campbell does not favour the idea that improved feeding is the important factor in the improvement, but considers that it is chiefly

due to the improved conditions of employment allowing more opportunity for fresh air and exercise. A physician writing in *The Times* makes the suggestion that the abolition of tight lacing in women has also had some influence in the general improvement.

BRITISH JOURNAL OF ANAESTHESIA

All those interested in anaesthesia should welcome this new quarterly journal called the *British Journal of Anaesthesia.*

The Editorial Board is composed of men of unquestionable ability and standing whose aims and objects on behalf of the practice of anaesthesia, as set forth in their *Foreword*, are the highest ethically and scientifically.

The first issue contains many interesting papers and abstracts, as well as much valuable information concerning the activities of anaesthetic societies. It is hoped that the future success of the *British Journal of Anaesthesia* will be made greater by the support of chemists, physiologists, pharmacologists, surgeons and anaesthetists.

At the International Physiological Congress in Paris Drs. E. Retterer and Voronoff read a paper on "The relation of physiological phenomena with the structure of the grafted testicles." A histological examination practised every month for nearly two years by Professor Retterer upon testicles grafted by Dr. Voronoff clearly proved that from the moment when the testicular cell at a certain age is transformed to a specific element, notwithstanding any morphological changes produced by its grafting on to a new site, that cell continued to possess the property of elaborating products of internal secretion which determine the physiological phenomena.—*Brit. Med. Journal*, August 4th.

WATER INTOXICATION

Dr. Leonard G. Rowntree, of Rochester, Minnesota, (*Brit. Med. Jour.*, Aug. 4) read a paper at the International Physiological Congress in Edinburgh, on Water Intoxication. He stated that in man and animals water ingested in excess of the excretory ability of the organism resulted in water intoxication. Water intoxication was manifested by restlessness, asthenia, polyuria with frequency of urination, diarrhoea, nausea and vomiting, muscular tremors and twitching, ataxia, and sometimes tonic and clonic convulsions followed by stupor and coma. The convulsions were general, extremely violent, and in the main resembled those of strychnine poisoning; they might recur at intervals of a few minutes. The condition terminated in death unless the excessive intake of water was stopped. As a rule these symptoms of water intoxication disappeared after the intravenous injection of hypertonic salt solution. The effect of the excessive administration of water on the blood had been studied in detail. Water had been given at half-hour intervals in amounts of 50 c.c. for each kilogram of body weight. The haemoglobin concentration was found to fall progressively. This loss might be as great as 25%, and was most rapid between the second and third hours after starting the experiment. It continued to increase slightly as long as the water was given, but returned to normal in from 12 to 24 hours after the ingestion of water was discontinued. There was also a decrease in the refractive index indicating a diminution of the protein per unit of the blood serum. The change in protein content was similar to that in the haemoglobin content of the blood. The salts in the blood serum were likewise decreased.

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Men and Books

SIR CHARLES BELL

We note that an excellent oil painting of Sir Charles Bell, one of the most eminent surgeons and investigators of the early decades of last century, has been presented by Mr. A. E. Webb-Johnson, Dean, to the Medical School of the Middlesex Hospital, which Bell was largely instrumental in founding, in the year 1835. Sir Charles Bell, a graduate of the Edinburgh school, left that city in 1804, becoming surgeon to the Middlesex Hospital and retaining that office until 1836 when he returned to Edinburgh to occupy the chair of surgery in his own "alma mater." Sir Norman Moore, in his biography of Bell in the Dictionary of National Biographies, writes:—"Bell's discoveries were the greatest that had been made in physiology since Harvey demonstrated the circulation of the blood. His fundamental experiment is thus recorded by himself in the book he published in 1811, entitled "*A new idea of the anatomy of the brain.*":—"On laying bare the roots of the spinal nerves in an animal recently killed. I found I could cut across the posterior fasiculus of nerves, which took its origin from the posterior portion of the spinal marrow without convulsing the muscles of the back, but that on touching the muscles of L back, but that on touching the anterior fasiculus with the point of the knife, the muscles of the back were immediately convulsed. I now saw the meaning of the double connection of the nerves with the spinal marrow." In 1882 Magendie in France discovered the fact that irritation of the posterior roots caused pain. Sir Charles Sherrington has said of these Bell-Magendie experiments that their importance can hardly be overstated. They proved that the incoming channel was in one spinal root and the outgoing in the other. There can be no doubt that Bell had the priority. In a letter dated January 9th, 1826, Bell wrote of his discovery, "It shows that two nerves are necessary to every muscle, one to excite action, the other to convey the sense of that action, and that each impression runs only in one direction." Bell also established the fact that the spinal nerves had filaments of both kinds, sensory and motor, but the anterior roots, springing from the spinal cord, are always motor, and the posterior roots sensory. To the genius of a great philosopher Sir Charles Bell united the qualities of a noble minded man. His rare originality, his profound knowledge, his varied accomplishments, and his unremitting industry did not save him from long and anxious struggles, but he neither abated the cheerfulness which was habitual to him, nor surrendered one jot of his independence. Bell was born in 1774, and died of angina pectoris near Worcester on April 28, 1842.

CHARLES GABRIEL PRAVAZ

In the *British Medical Journal* of August 18th, a short sketch is given of the history of orthopaedics and of notable orthopaedic practitioners, with special reference to the work of the French orthopaedist Pravaz, best known to English surgeons as the inventor of the syringe with a hollow needle, which has since been known by his name.

Little attention was paid by surgeons and the profession generally to deformities and their treatment until Stromeyer in the early decades of last century directed attention to them. Shortly afterwards Shaw and Harrison in England did pioneer work in the treatment of club foot. A notable person about that date was Sheldrake who was consulted by Byron. In *The Lancet* of 1828-29 there are numerous communications from this gentleman with a commendatory note from the editor, Mr. Wakley, but reading them at this date one fails to gather from his verbose communications, what measures he employed to achieve the cures of club foot of which he boasted. Sheldrake had no legal qualifications, and despite the sponsorship of the editor of *The Lancet* we fear his methods were those of a quack.

Pravaz was a very different personage. Born in 1791 in the south-west of France he graduated at the University of Paris in 1824. Connected by marriage with the proprietress of a

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girls' school, he had his attention directed to the treatment of scoliosis. Ultimately the girls' school became an orthopaedic institution. In 1827 he published a book under the title of *Methode nouvelle pour le traitement des deviations de la colonne vertebrale*, which was favourably reported on by the Academy of Medicine in 1829. In it he described his progressive extension bed which figured later in his treatment of congenital dislocation of the hip. The advance that he made in the treatment of this deformity gives him a just claim to our recognition of him as a thoughtful and clever orthopaedic surgeon. Pravaz appears to have seized on some of the important principles by which congenital dislocation of the hip can be cured. He relied chiefly on long continued extension with weights, which in some cases amounted to more than forty pounds; after which the dislocation was reduced by abduction and pressure, and maintained in the abducted position by means of a belt. Pravas also realized thoroughly the necessity of reforming the articulation. He had not the advantages obtainable by the use of plaster of Paris, the value of which had only begun to be recognized by Bouvier in the treatment of club feet. There can be no doubt of the functional value of his results in many cases, and his patients were immensely benefitted thereby. When Pravaz died his success was still disputed in Paris. It was unfortunate that his orthopaedic institute in the later years of his life had been moved to Lyons . He probably would have won greater appreciation for his work had his institute remained in or near Paris. Bouvier was at that time regarded as a great authority. Jealous of Pravaz, he used his influence against his methods. This, and the long time required by Pravaz's treatment, tended to throw the latter into disrepute, and probably retarded progress for forty years, until Pacci rediscovered the principles of Pravaz and Lorenz added to them and improved their application by using plaster of Paris. Looking back on the past it appears to us a tragedy that nearly two generations of hip-luxated cripples should have been deprived of benefits such as they might have enjoyed had the work of Pravaz been carried on.

Four Deaths Caused by Sodium Fluorid.—The amount of sodium fluorid varies from 16 to 63.6 per cent. in insecticide powders. Sodium fluorid has not been regarded as a poison, but William D. McNally, Chicago, is of the opinion that it is time that manufacturers and dispensers of insecticides label their products "Poison," and inform the public that the insecticides contain certain substances capable of causing death or seriously affecting the health of the individual when it is taken by mistake for a baking powder or a laxative. Three accidental deaths and one suicide are reported by McNally. The chief symptoms are burning in the stomach and bowel, muscular paralysis, vomiting and diarrhoea, and failure of the heart and respiration. Salivation was noted in only one case, while convulsions were not noted in any case. In suspected cases of poisoning, the soluble sodium salt may be rendered inert by conversion to the insoluble calcium fluorid by copious and repeated gastric lavage with lime water or a weak solution of calcium chlorid. Many mistakes in the future could be obviated if all insecticides were colored with 10 per cent. lamp black or other coloring matter.—*Jour. A. M. A.*, Sept. 8, 1923.

Post-traumatic Bone Tumors.—As far as he has seached the literature, S. D. Foster, Toledo, Ohio, says there is no experimental proof that injury has caused bone tumors. Some writers think there is an underlying constitutional factor, which with the trauma, causes bone tumors. During the war work many cases of bone tumors were reported, following injury, either with or without infection; but most of these war wounds were infected from the onset. The greatest task in this study is in the line of diagnosis. In view of the high mortality of sarcoma, especially as to its final results, it would seem advisable to take some extra time to make sure of the diagnosis. It would be better to save a limb in a benign case, even with the slight added danger from the time taken to make this diagnosis as complete as possible.—*Jour. A. M. A.*, Sept. 8, 1923.

Abstracts from Current Literature

MEDICINE

Researches on the Pupillary Reactions in Epidemic Encephalitis. Mehrtens, H. G., and Barkan, O. *Arch. of Neurol. and Psychiatry*, October, 1923.

The writers point out that the Argyll-Robertson pupil has been reported in conditions other than neuro-syphilis, e.g., chronic alcoholism, injuries and mid-brain tumours. It is also said to occur in epidemic encephalitis, but on examining reports in detail it appears that the original definition of the sign is not always followed very closely. The light reflex, for example, is sometimes spoken of as "absent" or "sluggish," whereas Argyll-Robertson's description was that the pupil was "insensible to light but contracted still further during the act of accommodation for near objects." It is contended that even though incipient or incomplete forms may be indicated by such terms as "partially lost" or "obviously diminished" light reflex, the use of these terms allows of inaccurate or obscure descriptions.

Thirty-six cases of epidemic encephalitis in all of whom the Wassermann reaction had been shown to be quite negative, were examined, special methods being used to measure both the light reflex and the accommodative power. The Argyll-Robertson pupil was found in no instance: where there was a sluggish light reflex there was usually also some impairment either of the power of convergence or accommodation. Eighty per cent. of the series showed varying degrees of paresis of the ciliary muscle, a point which was much emphasized in the discussion of the paper.

According to the statements of experienced observers who discussed this paper, it is indisputable that the Argyll-Robertson pupil has been noted in epidemic encephalitis, for, as was explained, it is not the pathologic nature of the lesion that matters so much as the region involved. The sign occurs frequently in syphilis because the syphilitic virus has a specific sensory affinity, attacking in particular the proto-neuronic terminations of the visual apparatus, hence causing paralysis of the light reflex and not of accommodation. But in epidemic encephalitis a variety of changes may be found, the Argyll-Robertson pupil, or its reverse, or paralysis of both light and accommodative reflexes. H. E. M.

The Quinine Test in Hyperthyroidism—Second Report. Bram, I. *New York Medical Journal and Medical Record*, September 19th, 1923.

This test is based on the observation that thyrotoxic patients show marked tolerance towards quinine. The writer emphasizes its simplicity and accuracy as compared with the Goetsch and basal metabolism tests. The former shows far too large a margin of error, and, he thinks, may not always be in the best interests of the patient. He admits the value of the basal metabolism test as an indicator of thyroid hyperactivity, but comments at some length and with much asperity on the possible sources of error in carrying it out. His work on the quinine test was first published in 1920, when he gave the results in a series of 160 cases. The present report covers a further 300 cases, with some controls.

The test is carried out by the administration of ten-grain capsules of quinine hydrobromide, given an hour after meals with plenty of water. It may be necessary to give some gastric sedatives with the quinine. In the normal or hypersensitive individual signs of intolerance will appear after one or two capsules. In the case of a hyperactive thyroid no symptoms of intolerance appear even with long periods of administration; there may indeed be much improvement in the hyperthyroidism.

According to the author the margin of error in this test is small because it depends only on those few who are naturally insusceptible to the drug; care must be taken to eliminate the cases which show increased tolerance due to such conditions as malaria, pneumonia, acute tonsillitis, etc., which, in any case, is a temporary tolerance only. He concludes that the test confirms the diagnosis of hyperthyroidism, but does not distinguish between toxic adenoma and Graves' disease. It is of aid in ruling out such conditions as simple non-toxic goitre, incipient tuberculosis, hysteria, paroxysmal tachycardia and diabetes mellitus. H. E. M.

Metastasis in Mumps. *Brit Med. Journal*, May 5th, 1923.

At a meeting of the Brighton and Sussex Medico-Chirurgical Society, Mr. George Morgan read a paper on "Metastasis in Mumps." He

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gave details of the illness of a boy aged fourteen who, during an epidemic of mumps at his school, developed parotitis on the right side followed by arthritis of the right knee, delirium, and urticaria. Subsequently he had an acute pericarditis, with endocarditis; and his urine boiled almost solid although no casts were found. Symptoms of mitral regurgitation followed, and a right sided pleurisy, with a morbilliform rash, pain and swelling of the right ankle, and an enlarged gland in the right axilla. Jaundice afterwards supervened, with a temperature and pulse rate continuously high, the pericardial friction and the regurgitant mitral murmur still being manifest. Severe pain and tenderness over the abdomen suggested the possibility of an acute pancreatitis. Blood cultures were sterile. After a prolonged convalescence the boy made a good recovery. Mr. Morgan also quoted the case of a man who, while playing billiards was accidentally struck by the cue on the left testicle. The organ rapidly swelled up, became painful and tender, and a few days later the left parotid enlarged and the swelling of the testis slowly subsided. Shortly afterwards symptoms of a meningeal infection developed with severe headache, vomiting and photophobia. He ultimately made a good recovery. Mr. Morgan thought that the virus of mumps was in the blood at the time. The injury caused it to attack the testicle before the parotid.

SURGERY

The End Results of Surgery of the Thyroid Gland. Pemberton, John de J. *Archives of Surgery*, July, 1923. Vol. vii, p. 37.

In recent years there has been great improvement in the immediate and end results of surgery of the thyroid gland. During the year 1922, in the Mayo clinic, 1,983 operations were performed on 1,497 patients with goitre. Nineteen patients died, a mortality by operation of 0.95%. In the earlier days of thyroid surgery the relatively high mortality rate was an influential factor in deciding many suffering patients to seek means other than surgery for cure. Many of these finally came to surgery at a late stage in the course of the disease when the operative risk was greatly increased. To-day, a much larger proportion of patients with goitre are operated upon early in the course of the disease. With a better recognition of the dangers associated with the surgical management, together with increased knowledge of the thyroid gland in health and disease, and the practical application of basal metabolism, the immediate and end results following operation are now comparable with those of any major surgical procedure.

The diseases of the thyroid gland amenable to surgery may be grouped under six headings, first diffuse colloid thyroid, second, adenoma without symptoms of hyperthyroidism; third, adenoma with hyperthyroidism; fourth, exophthalmic goitre; fifth, thyroiditis; and sixth, malignancy.

First, diffuse colloid goitre is a physiological enlargement of the gland occurring in adolescence, due to iodine insufficiency in the blood, and cured by the administration of iodine or thyroxin. Unless colloid goitre is associated with adenoma or by its size causes pressure or disfigurement, operation is not indicated. In cases in which operation is advisable the operative risk is less than one per cent. and the end results are good.

Second, adenoma without hyperthyroidism should be treated surgically, partly for cosmetic purposes and for the relief of pressure symptoms, and partly because a certain proportion of patients subsequently develop hyperthyroidism. Treatment other than operative is ineffective. The operative risk is less than 0.5%; in nearly 100% of cases successful operation results in complete cure. The very infrequent recurrence of symptoms may be attributed in nearly every instance to failure in removing all of the adenomatous tissue.

Third, if a patient with adenoma develops hyperthyroidism the onset is usually insidious, and only mildly progressive. Patients do not appreciate any great change in their condition until symptoms of marked cardiac irregularity or of decompensation develop. As a consequence visceral degenerative changes often develop adding considerably to the operative risk and diminishing the prospect of complete cure. The operative mortality is between two and four per cent. In from ten days to two weeks after the successful removal of the adenomatous tissue the hyperthyroidism has completely disappeared. After the lapse of two years, Judd found that about 83% of the patients operated upon considered themselves quite cured, and five per cent. more were markedly improved.

Fourth, in exophthalmic goitre the lowering of the operative mortality is due to an increased knowledge of the disease and of the dangers incident to surgery, and to the fact that such pa-

tients resort earlier to operation, before the development of visceral changes. In analysing the data obtained by mailing a questionnaire to each of 482 patients successfully operated upon during the year 1916, it was found that 315 of the 349 patients regarding whom replies were obtained, were living (90%); 34 (10%) had died from various causes. Of these 315, 188 (54%) considered themselves cured, their replies indicated that they no longer suffered from symptoms suggesting hyperthyroidism. In many of these, however, some amount of exophthalmos persisted. Eighteen (9.5%) had shown some evidence of recurrence, but were emphatic now in their statement that they are well. Thirty-six patients (19%) have still some swelling of the neck, which has persisted since operation. Eighty-eight patients (25.5%) are reported as greatly improved and able to carry on normal duties. Twenty-eight patients while improved have evidence of persistent or recurrent hyperthyroidism or of its residual effects. Nine only (3%) regarded themselves unimproved. Lack of improvement was attributed to, first, incompleteness of operation; second, the long duration of hyperthyroidism before operation; and third, failure to eliminate at the operation all foci of infection.

Fifth, thyroiditis is rare, and surgery is indicated only in tuberculous and suppurative types.

Sixth, malignancy occurs as sarcoma, carcinoma, malignant adenoma, and malignant papilloma, in the ratio of one malignant case in fifty-seven. The prospect of cure by operation and intensive radium and Roentgen ray treatment varies with the type of malignancy.

F. J. Tees

Intra-abdominal Adhesions. Deaver, John B. *Surgery, Gynaecolopy and Obstetrics*, October, 1923. Page, 506.

The application of the X-ray examination of the air containing abdomen has cleared up many cases of obscure diagnosis by showing the presence of adhesions, sometimes not suspected. These may be inflammatory or post-operative. The former are frequently protective, and temporary; later on being absorbed. Operative drains produce similar local inflammatory adhesions, which usually disappear. Adhesions are an indication of peritoneal injury by infection or trauma. Destructive adhesions occur chiefly in the right upper quadrant, involving the duodenum, gall bladder and colon. They often result in chronic stasis and partial obstruction. Free blood left in the abdomen; sutures, ligatures, and gauze swabs; friction and rough handling, and the use of chemical hand solutions favor the formation of adhesions. The hand stained with iodine leaves a trail of adhesions on its withdrawal. Proper operative technique; abstention from exposure of the intestines uncovered to the air; careful handling; absence of antiseptics; and perfect asepsis will do more than any local application to prevent adhesions. Viable omental grafts are better than anything to prevent adhesions to raw peritoneal-free surfaces. They are applicable to cover perforations, enterorrhaphy suture lines and to cover stumps. Post-operative purgation increases trauma by rendering the intestinal mucosa more permeable to toxins and bacteria. Gymnastic exercises, massage, hydrotherapy and open air life will often induce freedom from symptoms, if not the actual disappearance of abdominal adhesions.

Chas. K. P. Henry

Citrate versus Unmodified Blood Transfusion. Lederer, Max, M.D. *Surgery Gynaecology* and *Obstetrics*, August, 1923, page 221.

Reactions following transfusion have been the subject of much investigation and discussion. Although many explanations have been offered for their occurrence, no one explanation has been found satisfactory in every instance. It is the writer's purpose to present the results derived from a study of forty consecutive cases transfused by the citrate method as compared with forty cases transfused with unmodified blood, this second series immediately following the first. Those transfused by the first method were followed in a large percentage, (23 cases, 49.5%), by reactions more or less severe. In many of these reactions there were severe chills, cyanosis, rapid pulse, and elevated temperature; in one case as high as 107° F.; although the average was only 102° to 103°. In the forty cases in which unmodified blood was transfused, forty-nine transfusions were given without any reaction occurring. The nearest approach to these results were obtained by Lindeman who reports 214 transfusions by syringe method without any chill occurring. Lindeman's cases, however, were followed by rises in temperature and other symptoms. In our cases there was complete freedom

from any untoward symptoms. To offer an explanation for this absence of reaction is not easy. The perfection of the technique employed in the citrate transfusions compared favourably with that used in the unmodified method. In the writer's series of forty cases the donors were cross tested with the patient. Reliance was placed upon the direct admixture of the blood of the donor as the criterion of selection, ("mutual testing") rather than upon the identification of the group of the recipient and transfusion from an homologous donor. This method of testing is based upon that originally described by Rous Payton. Each one of the four donors is tested with that of the recipient; the blood is allowed to stand at room temperature for ten minutes and is then examined on a slide with a cover glass under the microscope, at the end of which time agglutination, if present, can be detected quickly and easily. In none of the series reported was the transfusion followed by any symptom referable to incompatibility. Two cases in females showed auto-agglutination of the patient's washed red blood cells, resulting in severe anaemia. They were cured by transfusion from a group four donor. Both the series of transfusions here compared were performed by means of one of the Miller instruments, first with the shuttle, more recently with the valve. The valve is the simplest and most consistent instrument for the purpose. When using it but one assistant is needed with very little paraphernalia; a transfusion of 500 c.c. can be completed easily in ten minutes.

The transfusions were carried out upon the usual class of cases, post-haemorrhagic, pathological anaemias, and sepsis. The most satisfactory results were obtained in cases of haemorrhage which include those of obstetrical, postoperative, and haemophiliac origin. In the group of the anaemias, while the statistics are favourable, they are not so favourable as in the first group. In the twenty-six cases of sepsis only four showed improvement. The difficulty of whole blood transfusion in desperately ill cases, when movement of the patient to the operating table was contra-indicated, is noted, and in some cases reported, was overcome by bedside transfusion. The writer quotes Mellon's suggestion of the possiblity of the reactions in citrate transfusion being due to the varying chemical reaction of commercial sodium citrate.

CHAS. K. P. HENRY

ANAESTHESIA AND ANAESTHETICS

Morphine, Hyoscine Hydrobromide Seminarcosis Preceding Operation. A report of one hundred cases with fifty checks. O'Keefe Chas. D. *The Journal of the Missouri State Medical Association*, April, 1923. Page 126.

The principal advantage of this method is the abolition of the period of anxiety and unrest immediately before the operation. It may even render the administration of a general anaesthetic unnecessary in minor operations such as the application of radium, removal of cervical polypi, dilatation of the cervical canal, etc. When a general anaesthetic is given much less is required. The induction is quicker and the convalescence smoother. One of three different techniques was used by the writer, according to the case. (1) Morphia, gr. $\frac{1}{4}$ and hyoscine hydrobromide, gr. 1/130 (1 cc.) given one hour and forty-five minutes before the time of operation, the hyoscine being repeated in forty-five minutes. (2) Same as 1, except that 1/6 of a grain of morphia instead of gr. $\frac{1}{4}$. (3) Same as 2, except that a third injection of hyoscine was given fifteen minutes before the time of the operation. Everything is done after the first injection to induce sleep by keeping the patient perfectly quiet and undisturbed. In technique No. 1, the dose of morphine (gr. $\frac{1}{4}$) was found to be too large for undersized delicate women as it caused marked slowing of respiration and cyanosis. The choice of the technique depends upon the individual case. The best results are obtained with the use of a third injection of hyoscine and cases where an anaesthetic was not used. There is an undesirable period of restlessness immediately following the operation in some cases, being most pronounced in those patients who received three injections of hyoscine.

W. B. HOWELL

Ethyl Chloride as an Anaesthetic for Minor Operations in Children. Rose, S. F. *The Lancet*, June 23rd, 1923. Page 1258.

The writer has administered ethyl chloride to children for dental operations 15,000 times without a fatality. His patients have varied in age from eighteen months to fourteen years. His experience has been limited to cases where the mask had to be removed to allow the operator to work. He has no experience of anaesthesia maintained

after the patient has once been put fully under. He has often given second or third doses when the first did not suffice. He has a closed bag and mask. Anaesthesia lasts from twenty to thirty seconds after removal of the face piece. Two to five c.cm. of ethyl chloride are used. Most of the cases were given with the patient in the sitting position. Special emphasis is laid on the importance of excluding all air from entering between the face and the mask. Occasionally syncopal attacks occur. They are indicated by bluish pallor of the face. The anaesthetic must be stopped and the patient inverted. Obstructed respiration sometimes occurs, but this can be dealt with in the usual way. W. B. HOWELL

PAEDIATRICS

Acute Secondary Anaemia in Infancy. Lucas, W. P., and Hoobler, H. R., *San Francisco. Trans. Amer. Ped. Society*, 1923.

The authors have grouped acute anaemias under four headings: (1) Mechanical loss of blood; (2) haemoglobin deficiency; (3) destruction of bone marrow; (4) combined blood cell and bone marrow destruction.

In the first group the predominating picture is that of regeneration which becomes evident as early as fifteen minutes after the haemorrhage. There is marked stimulation of the bone marrow and if proper dietary factors are supplied regeneration will be very rapid. The second group caused by deficiency in haemoglobin is a very large group, commonly found in premature infants, in twins, and in infants of anaemic mothers. In all of these infants there is a definite lack of iron deposited during foetal life. There is a marked reduction in haemoglobin out of proportion to the reduction of the red cells.

The third group depends on destruction of bone-marrow. The processes of destruction are going on more rapidly than those of regeneration. The blood picture shows a very low percentage of haemoglobin and a relatively low red cell count. A prominent feature is the marked reduction in the platelets. Extreme cases of this type are termed idiopathic aplastic anaemia.

The fourth group is that in which the blood picture and bone-marrow give a complex picture of blood destruction. There are signs of both degeneration and regeneration in the blood picture and evidence of marked activity in the bone-marrow. This is the picture of acute anaemia often found with acute pyogenic infections. Blood transfusions are of more benefit in this type than any other method of treatment. Frequent transfusions of small amounts (30 to 60 c.c.) have been found most efficacious.

L. M. LINDSAY

A Study of Pertussis in a Hospital. Herrman, Charles and Bell, Thomas. *Arch. Pediat.*, July, 1923.

Every case of spasmodic cough is not pertussis. The Bordet-Gengou bacillus is regularly present in the catarrhal stage of every true case. The contagion is usually not communicable after the fourth week. Bronchopneumonia was the most frequent complication. The principal aids in the early diagnosis are the presence of a relative and absolute lymphocytosis in the blood; the presence of the Bordet-Gengou bacillus in the sputum and a positive complement fixation test. Cutaneous tests did not prove of any value. Prognosis depends on the age of the child and the presence of any pulmonary complications. Pertussis is difficult to control because it is most communicable in the catarrhal stage when its true nature is not recognized.

The patient should be kept in bed in the open air. This conserves his strength and nutrition. Phenazone fortified by bromides was found to control the cough better than any other remedy. Pertussis vaccine has a specific effect in about one-fourth of the cases. Failure in this respect may be due to the presence of a different strain of bacillus. It is therefore better to have an autogenous vaccine prepared when the disease occurs in an institution for infants or young children. Our only hope for the control of whooping cough is a more perfect method of protective immunization.

L. M. LINDSAY

A Study of Hilum Enlargement in a Group of Tuberculous Children. Anderson, Edward Dyer. *Jour. A.M.A.*, October 6th, 1923.

The clinical problem of the diagnosis of enlarged hilum or tracheo-bronchial nodes in children, presumably due to tuberculous infection, has occupied the attention of many observers and particularly of those interested in the maladies of children, since the publication of D'Espine's work in 1889. More recently there has arisen some discussion as to the interpretation of the sign described by D'Espine, and of other associated clinical phenomena.

Morse, in an article concerning this question (Am. Jour. Dis. Children, Nov., 1922) gives a

description of his efforts to achieve a correct interpretation of this sign and says, "the sign to which D'Espine originally called attention is a whispering sound following the spoken voice heard over spinous processes, below the seventh cervical or first dorsal below which no such sound is heard normally." To verify this point, Morse examined one hundred and eighteen children in whom he suspected the presence of enlarged tracheo bronchial glands with a view to determine at what point the spoken and whispered voice and the breath sounds change from bronchial to vesicular and the possible presence of D'Espine's sign and of interscapular dulness; Morse concludes that a whispered sound after the spoken voice below the first dorsal, D'Espine's sign, is probably abnormal; that the bronchial sound of the voice and breath do not extend normally below the seventh cervical spine, and that continuation of these sounds below this level is definitely pathological and has the same significance as a positive D'Espine's sign. This latter is often the earliest abnormality; interscapular dulness being a late sign found only when there is extensive pathological change.

More recently Anderson, in an address before the American Medical Association concerning these signs, expresses great dissatisfaction with present methods of determining presence or absence of hilum gland enlargement. He examined ninety proven tuberculous children by the X-ray and the fluoroscope, and physical methods, and found such a marked discrepancy in figures, that is, children with enlarged glands by X-ray gave no auscultatory signs and those with some auscultatory signs were negative to X-ray, that he concludes that the presence of the accepted signs is not always indicative of enlargement of the glands. He finds that D'Espine's sign as described above, is difficult to elicit and is no more accurate than the level at which the bronchial character of whispered voice changes to vesicular. Also that this sign is often present when no enlargement of the nodes can be demonstrated by X-ray or fluoroscope. Anderson also finds the fixing of the seventh cervical spine as the point where the character of the voice changes, too high for the limit of normalcy for children of school age.

DERMATOLOGY

Match and Match-Box Dermatitis. Foerster, O. H. *J.A.M.A.*, October 6th, 1923.

A new variety of dermatitis is here described, with phosphorus sesquisulphide (P4S3) as the cause. This substance has entered into the composition of "strike anywhere" matches since 1914. White phosphorus has not been used in the manufacture of matches for a decade owing to the danger to operatives.

"Safety" matches have no effect on the skin as potassium chlorate is their chief ingredient. The box carrying safety matches, however, contains the sesquisulphide of phosphorus as a "strike" and is a skin irritant.

Seven cases are quoted where dermatitis was traced to matches or match boxes. When these were near or in contact with the skin, and when subjected to special conditions of heat and moisture, they developed irritant properties. In the above cases the matches or boxes were carried in the trousers' pocket and the dermatitis was situated on the thigh in each case. The abdomen was affected through the vest pocket in one case, and in another the face, eyes and ears developed a dermatitis carried apparently by the fingers.

By carrying a match box for three days in humid weather in his trousers' pocket the writer set up a dermatitis. The features of the disease are a preliminary pruritus, then an erythemato-papular eruption of varying intensity in contact with the pockets, followed the production of exudative, scaly, crusted, and later, lichenized lesions. Burning and painful sensations are often present in cases with only a mild inflammatory type of eruption. Recurring blepharo-conjunctivitis and facial dermatitis should lead one to look to matches as a possible cause.

The difficulties in diagnosis are shown by the fact that one of the cases had been mistaken for erysipelas and for chronic eczema of various types.

The treatment consists in the application of simple ointments and the strict avoidance of contact with matches for many months after the dermatitis has subsided. C. R. B.

The Importance of Blood Chemistry in Dermatology. Pulay, Edwin., *Arch. Derm. and Syph.*, August, 1923. Vol. 8, No. 2, p. 175.

Blood chemistry presents a new angle for the study of the pathogenesis of dermatoses. Therapeusis of skin diseases should be influenced by the results of these investigations. This paper refers to those of most practical importance, pruritus, eczema, and urticaria. Pruritus, where

universal, has in most cases an underlying disturbance of metabolism. Several groups are recognized, (1) uratic, including those of gastro-intestinal causation, with faulty purin metabolism as the final cause; alkali medication and cinchophen are advised. (2) Vagotonic pruritus with hyperglycaemia as the cause of the vagus irritability. This is treated by atropine and diabetic measures. (3) Impaired function of the kidneys accompanied the third group; blood analysis shows increase of chloride and residual nitrogen. The author considers pruritus frequently the first symptom of faulty kidney function. Diuretics (theophyllin) and Krell's milk treatment are recommended. (4) The neurogenous group point to a vegetative neurosis, with increase of calcium and hyperglycaemia. Disturbance of metabolism is considered the cause of eczematosis, a disposition of the skin to respond to eczematogenous irritation. Eczema is put down as a definite disease picture within this group. Eczematogenous irritations may be endogenous or exogenous. The latter require well recognized local treatment; general dietetic and internal medication (atropine and cinchophen) are recommended for the endogenous irritations, consideration is given to the effect of light on eczematosis in the hyperglycaemic cases. Sugar is one of the substances promoting a pronounced susceptibility to light.

Urticaria is attributed to metabolic changes marked by uricaemia, cholesterinaemia and chloraemia; most of the cases are associated with acid intoxication, suggesting treatment with alkali. Atropine is recommended, and as an antiphlogistic, cinchophen is considered valuable. A further group is attributed to sepsis, the result of tonsillar or renal mischief. Here the characteristic wheals are replaced by erythema.

The author would explain physico-chemically pruritus, oedema, exudation, (wheal formation, infiltration) by the change in the chemical condition of the cell, causing a disturbance of the balance of the ions and of osmotic pressure with resulting swelling. C. R. B.

A Condition Simulating Dislocation of the Head of the Femur.—R. Voigt (*Deut. med. Woch.*, June 8th, 1923, p. 761) confesses to a mistake which is liable to have serious consequences for the patient. It is the diagnosis of a sciatic dislocation of the head of the femur when the signs and symptoms are actually due to detachment of a fragment of bone from the upper margin of the acetabulum, the detached bone being driven into the joint. The case illustrating this accident was that of a middle-aged workman who, while he was stooping down on the railway line, was struck violently over the left hip by a railway carriage. He fell and could not get up again without help. Examination in hospital a few hours later showed great swelling of the left hip and thigh. The limb was flexed and adducted, being fixed in a position of internal rotation. The end of the great trochanter was approximately in Nélaton's line, and there was no shortening of the left leg. A sciatic dislocation was diagnosed, and the fact that the head of the femur could not be felt in the position it was supposed to occupy was explained away on the assumption that the great swelling of the affected parts masked the new position of the bone. When, however, attempts were made to reduce the hypothetical dislocation, slight crepitation was detected. An x-ray examination revealed the true state of affairs. Had not the crepitation been detected serious injury might have been inflicted.—*Brit. Med. Jour.*, Aug, 4, 1923

Therapeutic value of Transuterine Gas Inflation.—The cases of relief from dysmenorrhea following gas inflation, Reuben Peterson and Roland S. Cron, Ann Arbor, Mich., believe have been too few to warrant the drawing of any conclusions; but the relief has been so marked following the gas inflation that the authors are using it deliberately for the relief of this symptom alone. From hundreds of cases of transuterine gas inflation, they are convinced that the method is without danger, if certain precautions are taken in the selection of cases. It is a far simpler procedure than uterine dilation or the insertion of a uterine stem. The authors are using it constantly in the office as well as in the clinic.—*Jour. A. M. A.*, Sept. 22, 1923.

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News Items

GENERAL NEWS

ONTARIO AND QUEBEC SECTION OF AMERICAN COLLEGE OF SURGEONS

MEETING AT OTTAWA, NOVEMBER 22nd, 1923

PROGRAMME

Registration and Information, Chateau Laurier

HOSPITAL CLINICS

8.00 A.M.—12.00 Noon (See Daily Bulletin)

11.00 A.M.—12 Noon

Clinical Address, Carleton County Protestant General Hospital

End Results in Abdominal Surgery.—Dr. George W. Crile, Professor of Surgery, Western Reserve University, Chief Surgeon to Lakeside Hospital, Cleveland, Ohio.

12.30 Noon—1.30 P.M.

Luncheon—Chateau Laurier

Address of Welcome by His Worship, Mayor Plant of Ottawa.

2.00 P.M.—4.30 P.M.

Hospital Conference, Ball Room, Chateau Laurier
Dr. A. T. Shillington, presiding

The Hospital Standardization Programme of the American College of Surgeons.—Franklin H. Martin, M.D., Chicago; Director-General, American College of Surgeons.

Hospital Standardization as a Factor for Better Surgery. W. W. Chipman, M.D., Montreal; Professor of Gynaecology and Obstetrics, McGill University; Chief Gynaecologist and Obstetrician Royal Victoria and Montreal Maternity Hospitals.

Hospital Standardization as a Factor for Better Hospital Administration.—A. K. Haywood, M.D., Montreal; Superintendent, Montreal General Hospital. D. M. Robertson, M.D., Superintendant Carleton County Protestant General Hospital, Ottawa.

Essentials for a Successful Staff Conference.—D. A. Craig, M.D., Chicago; Associate Director, American College of Surgeons—State and Provincial Activities.

An Adequate Pathological Service for the Hospital.—Oscar Klotz, M.D., Toronto; Professor of Pathology, Toronto University.

Fundamental Principles Underlying the Programme of Hospital Standardization.—Rev. C. B. Moulinier, S. J., President Catholic Hospital Association.

The 1923 Survey and Plans for the Future.—M. T. MacEachern, M.D., Chicago; Associate Director, American College of Surgeons—Hospital Activities, President American Hospital Association.

ROUND TABLE CONFERENCE

Conducted by M. T. MacEachern, M.D., Chicago

Discussion led by W. H. Delaney, M.D., Quebec, Que.; W. L. Ritchie, M.D., Ottawa, Ont.; George Ramsey, M.D., London, Ont.; Frederick B. Mowbray, M.D., Hamilton, Ont.; C. B. Keenan, M.D., Montreal, Que.; Roscoe R. Graham, M.D., Toronto, Ont.; C. E. O'Connor, M.D., Kingston, Ont.

4.30 P.M.—5.00 P.M.

(*a*) Activities of the American College of Surgeons (Illustrated).

(*b*) Election of Officers: Executive Committees Ontario and Quebec.

8.00 P.M.—10.00 P.M.

Community Health Meeting, Ottawa Collegiate Institute, Lisgar Street, Under the Patronage and in the presence of Their Excellencies, the Governor General and Lady Byng, of Vimy.
A. D. Shillington, M.D., presiding

The Programme of the American College of Surgeons.—Franklin H. Martin, M.D., Chicago; Director General, American College of Surgeons.

Conservation of Maternal and Child Life and Better Care for the Prospective Mother.—W. W. Chipman, M.D., Professor of Gynaecology and Obstetrics, McGill University, Chief Gynaecologist and Obstetrician, Royal Victoria and Montreal General Hospital.

What Scientific Medicine has done for the World.—George W. Crile, M.D., Professor of Surgery, Western Reserve University; Chief Surgeon to Lakeside Hospital, Cleveland.

The American College of Surgeons and Better Hospitals.—M. T. MacEachern, M.D., Associate Director, American College of Surgeons—Hospital Activities; Director-General, Victorian Order of Nurses for Canada.

Our People, our Hospitals and our Profession.—Rev. C. B. Moulinier, S.J., President Catholic Hospital Association.

The American College of Surgeons as a Factor in Public Health.—D. A. Craig, M.D., Associate Director, American College of Surgeons—State and Provincial Activities.

Health Film—"The Reward of Courage."

GOD SAVE THE KING

NOVEMBER 23rd, 1923

HOSPITAL CLINICS

8.00 A.M.—11.00 A.M. (See Daily Bulletin)

11.00 A.M.—12.00 Noon

Clinical Address, Ottawa General Hospital.—W. W. Chipman, M.D., Professor of Gynaecology and Obstetrics, McGill University.

(*a*) Diagnosis and Treatment of Ectopic Gestation

(*b*) Uterine Haemorrhage, its Significance and Treatment.

Clinical Address, St. Luke's Hospital,
F. N. G. Starr, M.D., Associate Professor of Clinical Surgery, Toronto University—Some of the Problems of the Right Iliac Fossa.

12.00 Noon—1.00 P.M.

Lucheon at Carleton County Protestant General, Ottawa General and St. Luke's Hospitals

2.00 P.M.—5.00 P.M.

Scientific Session, Ballroom, Chateau Laurier

Renal Tuberculosis.—L. J. Austin, M.D., Professor of Surgery, Queen's University.

The Bad Risk Patient with Special Reference to Abdominal and Thyroid Operations.—George W. Crile, M.D., Professor of Surgery, Western Reserve University; Chief Surgeon to Lakeside Hospital, Cleveland.

The Management of Labour in Contracted Pelves.—W. W. Chipman, M.D., Professor of Gynaecology and Obstetrics, McGill University; Chief Gynaecologist

and Obstetrician, Royal Victoria and Montreal Maternity Hospitals, Montreal.

The Surgeon and the Student.—Oscar Klotz, M.D., Professor of Pathology, Toronto University, Toronto.

Address (subject to be announced later).—George D. Stewart, M.D., Professor of Surgery, University and Bellevue Hospital Medical College, New York City.

Address (subject to be announced later).—Sir Henry Gray, Chief Surgeon to Royal Victoria Hospital, Montreal.

INTERCHANGE OF HEALTH OFFICERS IN THE UNITED STATES

An event which may be fraught with far reaching consequences for world health is the Third General Interchange of Health Officers arranged by the Health Section of the League of Nations which is now taking place in the United States. Representatives from France, England, Italy, Russia, Poland, Spain, Holland, Belgium, Greece, Jugoslavia, Germany, Switzerland, Norway, Mexico, San Salvador, Brazil, Chile, and Canada, delegated by their respective governments to participate in a course of study and observation, arrived in America the first week in September and will remain for approximately three months. Until September 22nd the delegates will remain in Washington, studying national health organization as administered by the United States Public Health Service. Following the close of the course of study of the national health agency, the delegation of visitors will separate into three groups, one of which will proceed to Virginia, another to North Carolina and a third to Alabama, where about three weeks will be spent in studying state and local health departments. Richmond, Va.; Raleigh, N. C. and Montgomery, Ala., are the Southern cities which have been selected for study. From there the groups will proceed to Massachusetts, New York and Pennsylvania, respectively, for the purpose of studying the health administration in three northern states and small cities. Syracuse, N. Y.; Allentown, Pa.; and one of the smallest cities of Massachusetts yet to be designated, will be visited for a short period. Following this the groups will make a study of health administration in three of the large cities of the east, namely, Boston, New York, and Philadelphia. Present plans call for a re-assembling of the entire delegation in Washington late in November for a final conference.

The group of visiting sanitarians number among its members many of the most eminent in the world. Canada is represented by Dr. M. M. Seymour, Deputy Minister of Public Health, and Director of Venereal Disease Control, Saskatchewan. The delegation is accompanied by Dr. Norman V. Lothian of the Health Section of the League of Nations. Surgeon General Hugh S. Cumming, of the United States Public Health Service, delivered the address of welcome to the delegates.

ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about Three Hundred Dollars, will be made on July 14, 1924, provided that an essay deemed by the Committee of Award to be worthy of the Prize shall have been offered. Essays intended for competition may be upon any subject in medicine, but cannot have been published. They must be typewritten, and if written in a language other than English should be accompanied by an English translation, and must be received by the Secretary of the College on or before May 1, 1924. Each essay must be sent *without signature*, but must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within the name and address of the author. It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; other essays will be returned upon application within taree months after the award. The Alvarenga Prize for 1923 has been awarded to Dr. Edward P. Heller, Kansas City, Mo., for his essay entitled: "Treatise on Echinococcus Disease." John H. Girvin, *Secretary*, 19 South 22nd Street, Philadelphia, Pa., U. S. A.

It is with pleasure that we note as we are going to press that the Nobel Prize for Medicine for 1923 has been awarded to Drs. F. G. Banting and J. J. R. Macleod of Toronto, for their discovery of Insulin. Dr. Banting is the first Canadian to receive a reward from this Foundation. He is a native of Alliston, Ont., and a graduate of the faculty of Medicine of Toronto University. He made a brilliant record as a student and also attracted attention while engaged in his post graduate studies overseas. During the Great War he served for three years with distinction and was awarded the Military Cross for valour. Upon his return he held posts at the Christie Street Hospital, Toronto, for disabled soldiers, and later at the Sick Children's Hospital in that city. Finally he devoted himself to research work in the Connaught Laboratories of the University of Toronto. The Nobel prize is awarded by a Board of Directors who have charge of the fund amounting to $9,000,000 bequeathed by the Swedish scientist Alfred B. Nobel who died in 1896. Under the direction of the Board awards of an average value of about $40,000.00 each are made, not only in medicine but in physics, chemistry, literature and several furthering the cause of peace. The Board of Directors consists exclusively of Swedes.

Dr. Frederick G. Banting, who, along with Professor J. J. R. Macleod, has been awarded the Nobel preventive mediene in the University of Toronto, has Prize, expressed his deep appreciation this morning for the assistance which he has received from all his co-workers in the discovery of insulin. "I desire to share my portion of the award with Mr. Best," said Dr. Banting this morning. "Both in the honour and the financial aspect, and, furthermore, the financial end will be devoted to the advancement of medical research in some line.

"I also would like the medical sciences of Canada to share with me the honours which have come. I would like to mention again with grateful appreciation the assistance which I have received from Prof. V. E. Henderson, Dr. Fitzgerald, of the Connaught laboratories, and Dr. R. D. Defries."

Dr. Banting denies absolutely that he has been working on a serum to combat pernicious anaemia. Ever since the report got around he has been having letters, telegrams and messages of all sorts coming in upon him. He said "the greatest service people can do is to leave us alone to work."

FUND BEING RAISED FOR ST. ANDREW'S INSTITUTE

At a meeting of the Council of the St. Andrews Institute of Clinical Research it was reported that the sum of £5,000 had been received as a first instalment of the fund being raised by the well-wishers of the institute in Perthshire. The institute was established in 1919 by Sir James Mackenzie, M.D., F.R.S., who is a native of Perthshire. Convinced that an institute was necessary for the investigation of the cause and origin of disease and amelioration of human suffering, Sir James Mackenzie gave up a large consulting prac-

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tice in London in order to devote his whole time and energies to this work. During the four years of its existence the institute has made some valuable contributions to medical science.

The Perthshire fund is being raised as a tribute to the great work of a son of Perthshire. It is hoped that a total of £10,000 will be reached. The method of investigation is entirely new, and there is no similar system or institute in Great Britain or, indeed, any other country in the world. The manager of the Bank of Scotland, Perth, is the hon. treasurer of the fund.

In the Bulletin of the Canadian Tuberculosis Association, the detail is given of the time given to instruction in tuberculosis in the various medical schools of the country. It is quite evident from the statement made that instructions in tuberculosis are being given in a well regulated manner about the country. It is interesting to note that at the University of Montreal there is an Institute Bruchesi founded for the purpose of instruction in tuberculosis, and that there is a chair of Phthisiotherapy endowed.

The papers presented at the Annual Meeting of the Canadian Tuberculosis Association at Edmonton, have been put together in a serviceable booklet for distribution. Many problems in tuberculosis are handled by men well known for their work in the subject, rendering the booklet interesting reading. Copies can be procured from the Canadian Tuberculosis Association, Bank St., Ottawa.

The Department of Health has issued a pamphlet of twenty-two pages giving the latest and most practical details regarding the diagnosis and treatment of the venereal diseases. It is sent forth as an appendix to previous pamphlets. The Deputy Minister congratulates the members of the medical committee of the Canadian Social Hygiene Committee on the excellence of their contribution. We desire also to congratulate the Department of Health on the good work it is doing in the publication and free distribution of pamphlets on so many subjects affecting public health.

NOVA SCOTIA

A very attractive programme has been outlined for the coming season's meetings of the Halifax Medical Society. The society will meet this session under the presidency of Dr. M. G. Burris.

Recent defections from the ranks of single blessedness include Drs. P. N. Balcom, of Aylesford; C. E. Aikens, of Guysboro'; C. M. Bayne, of Kentville; and A. M. Hebb, of Dartmouth. The *Journal* extends congratulations and best wishes to all these gentlemen.

An investigation of the financial affairs of the City Health Board of Halifax has disclosed a shortage in the accounts of the Secretary, and has led to the dismissal of that official. A reorganization of the department is being considered.

The classes in Medicine at Dalhousie University were resumed September 12th. Several additions to the staff of the Faculty of Medicine have been made recently. Dr. Clyde Holland, who won distinction at Dalhousie in both Arts and Medicine, and Dr. Margaret Chase, (B.A. Acad. and M.D. Dal.) have been appointed to full time positions in the departments of anatomy and pathology respectively. Mr. R. J. Bean, formerly of the staff of the Western Reserve University, has been appointed associate professor of histology and embryology. Dr. E. Gorden Young, associate professor of bio-chemistry at the Western Ontario University, has been selected as the head of the department of bio-chemistry, but will not assume duty at Dalhousie until the first of the new year. The vacancy in the department of biology, created by the resignation of Professor J. A. Dawson, has been filled by the appointment of Professor J. N. Gowanloch, recently of the Wabash College staff. The affiliation of King's and Dalhousie, which has happily been accomplished, has combined the teaching force of the two universities, and Professor N. J. Symons, of which King's foundation, will henceforth give the instruction in psychology to the medical classes, while Professor A. S. Walker, also of King's foundation, will lecture to the first year medical students on the History of Thought; a new subject which replaces the option formerly allowed.

The post-graduate week, conducted under the auspices of the Medical Faculty of Dalhousie, again proved very successful this year. The attendance was most gratifying, and the committee of arrangements, of which Dr. George H. Murphy was chairman, and Dr. Alan Curry was secretary, received much praise for the manner in which the programme was arranged and carried out. On the eve of the concluding day, a dinner was tendered to those who had participated in the course by the Governors of the University. This function was held at Shirreff Hall, the beautiful new residence for lady students, and proved to be most enjoyable. During the evening, reference was made to the proposal to attempt a graduate school at Halifax next year, with Shirreff Hall as the home *pro tempore* of those attending the school. The proposal was received with great enthusiasm, and several of those present at once announced their intention of taking the course, as they could conceive of no more ideal arrangement for combining instruction and recreation. It is intended that this school shall be Canadian in character, as it is expected that much of the teaching will be done by men from other colleges, and it is felt that physicians from the interior will welcome the opportunity of receiving graduate instruction under an arrangement which will permit of much pleasant recreation in the delightful weather which characterizes the summer season in Nova Scotia.

PRINCE EDWARD ISLAND

The annual meeting of the Prince Edward Island Medical Society was held at Summerside on Wednesday, July 11th, 1923. Dr. J. A. McPhee, the President, in the chair. The morning session was devoted to general business. Dr. R. F. Seaman of Charlottetown, was elected President for the ensuing year. The President's address, by Dr. McPhee, reviewed the advance of surgery during the last few years, laying

emphasis on application of modern methods to general practice as we see it in country towns. Dr. Alex. MacNeill of Summerside, gave a case report on a "Septic Knee Joint," which was discussed by Dr. Bazin of Montreal. Dr. W. Tidmarsh, of Charlottetown, read a paper entitled "The Protein Milk Treatment of Diarrhoea in Bottle-fed Infants." In the afternoon, Dr. F. H. MacKay of Montreal read an excellent paper on "Encephalitis Lethargica." This was followed by a paper on "Brain Infections" by Dr. S. J. McLennan, of Halifax. Prof. W. L. Holman of Baltimore gave an excellent presentation of the more important facts of Bacteriology and Immunology as applied to general practice. Dr. David W. MacKenzie of Montreal read an interesting paper illustrated with lantern slides, on "Haematuria, its Common Causes" a review of 900 such cases admitted to the Department of Urology, Royal Victoria Hospital. Dr. A. T. Bazin of Montreal presented a review of the literature on "Intussusception, Primary and Secondary," and reported a very instructive case. The meeting was closed by a dinner at the Queen's Hotel. The whole meeting was a definite success, as nearly every practicing physician on Prince Edward Island was present, along with several visitors . The President in reviewing his programme, announced, with pride, that three of his visiting contributors were natives of the province. The next meeting will be held at Charlottetown, and it is planned, if possible, to have it in connection with the Maritime Section of the American College of Surgeons.

D. W. Mack

QUEBEC

Dr. Kanaan Offiesh was tendered a branquet recently by the Syrian National Club on the occasion of his departure for Egypt, where his father is seriously ill.

A course of lectures on "The Treatment of Venereal Diseases" has been given by Professors Archambault and Fournier at the Notre Dame Hospital, Montreal, during the present month, and has been open to physicians on the payment of a small fee.

Dr. V. M. MacDonald, director of the Child Welfare Association of Montreal, has been selected as one of the Canadian delegates to represent the Dominion at the first annual meeting of the American Child Health Association, which will be held in Detroit, Michigan.

Dr. John Copeland has recently taken over his new duties as assistant superintendent of the Montreal General Hospital. Dr. Copeland succeeds Dr. Don Smelzer, who has left for Buffalo, N.Y., to assume the post of assistant superintendent of the General Hospital there. A graduate of McGill, class 1921, Dr. Copeland has been on the staff of the Montreal General Hospital since graduation. He served overseas and was seriously wounded.

Dr. T. J. W. Burgess, since 1890 superintendent of the Protestant Hospital for the Insane at Verdun, was presented with a hall set recently by the staff on the occasion of his retirement as active manager of the institution. Dr. Burgess, who will be succeeded by Dr. C. A. Porteous, becomes consulting physician to the hospital. Dr. Burgess also received from the board of managers and friends a cheque in recognition of his long and faithful services.

Dr. Gordon Byers returned to Montreal late in September after spending the summer in Switzerland. Dr. Byers was much interested in, and carefully studied the working of, the new Gullstrand slip-lamp. With this apparatus the interior of the eye can be brilliantly lighted and viewed under great magnification. The instrument, which is of practical value and of great scientific interest, has been specially developed by Professor Vogt, who holds the chair of ophthalmology in Zürich.

Dr. Donald C. Smelzer, late assistant superintendent of the Montreal General Hospital, who will assume the duties of assistant superintendent at the Buffalo General Hospital, graduated in 1918 and immediately went overseas. He served as medical officer in the Near East for some time. On his return invalided to Canada he became connected with the Ste. Anne's Military Hospital at Ste. Anne de Bellevue. In 1921 he joined the staff of the Montreal General Hospital, where he acted as admitting officer for a year; afterwards succeeding Dr. M. Young, as assistant to Dr. Haywood. On the occasion of his departure, he was the recipient of many good wishes from his hosts of friends both in the hospital and in the city generally.

The first meeting of the Montreal Medico-Chirurgical Society was held in the Chambers, 176 Mansfield Street, on the evening of October 5th, 1923. The feature of the meeting was the address of the retiring president, Dr. Harry S. Shaw, on the Renaissance of Medicine, presenting a sketch of the literary and historical phase of medicine during its long struggle for freedom from the bonds of the prevailing superstition of earlier periods. Short pen-pictures of the men who made this renaissance possible were features of the address.

Dr. Laidley read an eulogistic address on the life and works of the late Sir Thomas Roddick. His remarks were greatly appreciated for they bore testimony to his character as a kind and considerate friend as well as to his ability as a surgeon. An informal smoker closed the meeting. Dr. W. F. Hamilton on behalf of the Society presented Dr. S. Hanford McKee, the retiring secretary, with a gold fountain pen in recognition of the faithful services which he had rendered as secretary during the last 17 years, to which Dr. McKee suitably replied.

ONTARIO

OTTAWA'S NEW MATERNITY HOSPITAL

Ottawa's new Maternity Hospital, erected by the Salvation Army with subscriptions received from the Kiwanis and Rotary Clubs, Masonic and Orange Lodges, and other societies, and by local business firms and private individuals, is now well on in its second year of operation.

The hospital has forty-six obstetric beds, two delivery rooms, and is equipped for surgical obstetric work

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—the operating room being largely furnished by the Ottawa Medical Society. The chart forms are compiled from those of the leading American and Canadian Maternities—those of the Chicago Lying-In proving especially worthy of adoption. The Record System is the Unit History System of the Presbyterian Hospital, New York, having one cardboard cover for all records of a mother and her children for repeated admissions.

During the first year there were 600 deliveries, 2 Caesarean Sections, 2 blood transfusions on mothers and 3 on babies. There was one maternal death due to the toxaemia of pregnancy.

The hospital has an attending staff including a pediatrician, but is open and used by doctors from the surrounding country even as far distant as twenty-three miles.

On September 27th, Dr. J. C. McClelland of Toronto, addressed the Bruce County Medical Society at Tara on "Diseases of the Genito-Urinary Tract."

The opening meeting of the Academy of Medicine, Toronto, took the form this year of a dinner, followed by an address of the President, Dr. John T. Fotheringham.

Sir William Lister, K.C.M.G. will speak at the section of Ophthalmology and Oto-Laryngology on Monday, October 29th, taking as his subject "Holes in the retina and their clinical significance."

On October 4th, Dr. John Oille of Toronto, addressed a meeting of the Peterborough Medical Society on "The Diagnosis, Prognosis and Treatment of Cardiac Irregularities."

On October 5th, Dr. E. R. Secord of Brantford, read an interesting paper on "Fractures," at Lindsay, Ont., before a meeting of the Victoria County Medical Society.

The Lambton County Medical Society met on October 10th at Forest; an address was given by Dr. D. E. Robertson of Toronto, on "Acute Osteomyelitis."

On October 10th, the Hastings County Medical Society met at Trenton, and listened to an address given by Dr. L. J. Austin of Kingston, on "Carcinoma of the Breast."

The Simcoe County Medical Society met at Allandale on October 18th; an address was given by Dr. E. E. Cleaver of Toronto, on "The Etiology, Diagnosis and Medical Treatment of Gastric and Duodenal Ulcer."

The Lincoln County Medical Society held a meeting on September 28th in St. Catharines; an address was given by Dr. A. Moir of Peterborough, on "The Diagnosis of Surgical Diseases of the Gastro-Intestinal Tract."

On October 11th, the Northumberland and Durham Medical Society met at Port Hope; two addresses were given, one by Dr. A. J. Grant of London, on "Office Treatment of Haemorrhoids and Kindred Conditions under Local Anaesthesia," and one by Dr. W. B. Hendry of Toronto, on "Obstetrical Injuries and their After Results."

The University of Toronto will be represented at the Tri-State District Medical Association, to be held in Des Moines, Iowa, October 29th, 30th and 31st, by President Falconer and Dr. Clarence K. Starr of the Department of Surgery. Dr. Starr will conduct a clinic dealing with fractures and surgical treatment of the extremities. Dr. Falconer will give an address on "The fashioning of the English people," and will also be one of the speakers at the formal banquet.

Huron Medical Association held its quarterly meeting at Goderich on October the 5th. Papers were read by Dr. Milne of Blythe, Dr. B. C. Weir of Auburn ,and Drs. A. H. Macklin and Harold Taylor of Goderich.

The officers appointed for the ensuing year were, President, Dr. R. C. Redmond of Wingham; Vice-President, Dr. Margaret Calder of Wingham; Secretary-Treasurer, Dr. Stewart of Wingham.

Following a custom inaugurated a year ago during the provincial meeting of the American College of Surgeons, the Academy of Medicne invited the public to a Community Health Mass Meeting in the Majestic Theatre as a tangible, practical expression of the interrelations of the public and the profession. There was a large audience and it is certain that the message of Cancer Control and Goitre Prevention has gone deep into the minds of the London public.

Drs. Stuart Evans and A. E. Mahood, of Ottawa, have returned from a clinical trip to Vienna. They report excellent courses in anatomy, major cadaver surgery, and surgical pathology at very moderate cost. They were not impressed with the operative work. Among many interesting items they report are the German abortion laws. Factors which prejudice the welfare of a child, such as tuberculosis in the husband, or even unemployment, are legitimate indications for a dilatation and curettage. N. M. G.

Improvements and changes in the administration of the Ontario Public Institutions have been undertaken by the cabinet of Premier Ferguson. These changes are in the line of co-ordinating all Health and Social Service branches in the province under Dr. Forbes Godfrey, Minister of Health. The change will affect such clinics as the dental and general health clinic which were formerly administered by a sub-department under the Minister of Education. It is planned that ultimately the absolute control of the asylums and the provincial hospitals will be placed under the Health Department for all purposes, and it is felt that the Department of Health will expand into one of the most important departments of the government.

The annual meeting of District No. 2 of the Ontario Medical Association was held on October 3rd in Stratford, under the auspices of the Perth County Medical Association. The meeting was well attended by doctors of the entire district. During the afternoon session, Dr. E. M. Eberts of Montreal gave a very instructive paper on "Myocardial Changes in Exophthalmic Goitre and Toxic Adenoma; pre-operative treatment and post-operative results of same." This was followed by a paper by Dr. John Phillips of Crile Clinic, Cleveland, on "A general Discussion of some of the problems of diagnosis and treatment of Gall Bladder Disease." The afternoon meeting was followed by a banquet at the Chamber of Commerce at which Dr. Weston Krupp of Woodstock, the District representative, presided. Instructive addresses were given on "A Résumé of the Work of the Past Year," by Dr. F. C. Routley the Secretary, and by Dr. J. F. Argue of Ottawa, President of the Ontario Medical Association.

The Annual Medical Day held under the auspices of the Hamilton Medical Society and the staff of the Hamilton General Hospital, took place on Wednesday, October 10th, 1923, at the Hamilton General Hospital. The morning session was a surgical clinic conducted by Dr. J. H. Gibbon, Professor of Surgery, Jefferson Medical

College, Philadelphia, Pa., who demonstrated the surgical procedure in conditions affecting the stomach, duodenum, chest, and the thyroid glands. In the x-ray department there was the presentation of an illustrated paper by Dr. W. N. Carrick. The medical clinic in the evening was conducted by Dr. Thomas Macrae, Professor of Medicine, Jefferson Medical College, Philadelphia, Pa. Dr. Macrae dealt in particular with, (1) Encephalitis, (2) Joints, (3) Auricular Fibrillation, (4) Asthma, (5) Intravenous Medication, (6) Anemias, (7) Acute Rheumatic Endocarditis.

The Board of Governors of the Hospital invited those attending the clinics to luncheon in the nurses' dining hall. In the evening the Society dined at the Royal Connaught Hotel and were addressed by the Honourable Forbes Godfrey, Minister of Health and Labour, and by Dr. F. B. Mowbray, of Hamilton.

The Annual Meeting of District Number Six in the Ontario Medical Association, comprising the Counties of Victoria, Peterborough, Durham, Northumberland, Prince Edward, Hastings and Halburton, was held at Cobourg on Thursday, September 27th. During the afternoon the following programme was presented:—"Some Side Lights on So-called Indigestion," by Dr. John A. Macgregor, London; "Exophthalmic Goitre," by Dr. I. G. Bogart, Kingston; "The Right Iliac Fossa—A Plea for care in diagnosis and treatment," by F. N. G. Starr, Toronto. The discussion which followed each paper contributed materially to the interest of the session. At 5.00 p.m. the doctors were the guests to tea of Dr. and Mrs. Hayden, the local doctor's wives assisting Mrs. Hayden with what proved to be a very delightful hour. At 7.00 p.m. the meeting reconvened at the British Hotel where a most sumptuous banquet was served, being immediately followed by addresses from Dr. Mylks, Kingston, on "Gynaecological Emergencies in General Practice, with Diagnosis and Treatment;" Dr. J. F. Argue, Ottawa, President of the Ontario Medical Association and Dr. T. C. Routley, Secretary. The attendance during the day was between eighty and ninety, a most creditable showing indeed and by far the largest attendance that has turned out to a meeting of the district. Congratulations are due Dr. E. A. McQuade of Trenton, Counsellor of the District and to the Northumberland and Durham Medical Society under whose auspices the meeting was held, for carrying out not only an interesting and pleasing programme, but one of real value and merit to the profession who attended.

District No. 1 of the Ontario Medical Association, comprising Middlesex, Elgin, Lambton, Kent and Essex held their sectional meeting in London on October 4th, in conjunction with the meeting of the Western Ontario Academy of Medicine. There was an excellent attendance from all parts of the district and enthusiasm was everywhere apparent. Morning visitors had opportunity to visit the Medical School of the Western University and attend clinics in Victoria Hospital or laboratory demonstrations in the Medical School. Luncheon at the Tecumseh House furnished an opportunity for fraternizing informally, and at two o'clock the regular program was inaugurated in the Medical School Auditorium. Dr. A. J. Grant presided and introduced the President, Dr. J. F. Argue of Ottawa, who delivered an inspiring address. He was followed by Dr. T. C. Routley whose speech was marked by enthusiasm for the future of organized medicine in Ontario. The achievements of the past year had been both notable and creditable, but there was much yet to be done to further the advancement of the profession both individually and in its organization. A large number of practising physicians are not yet enrolled; there are still abuses to correct both within and without the profession. The scientific part of the programme was furnished by the two visiting physicians and the value of their contribution was evidenced by the lively discussion which followed the reading of their papers. Dr. J. C. Bloodgood of Baltimore, was welcomed enthusiastically on his second visit to Western Ontario in the cause of concer control. He took as his subject, Cancer of the Breast, giving the results of his experience of emphasizing the fact that early diagnosis means a greater percentage of cure was stressed. Dr. O. P. Kimball discussed hyperthyroidism, claiming that the value of basal metabolic rate was a valuable index, if properly interpreted. He stressed the value of giving sodium bromide, combining it in nearly all his cases with sodium iodide for a term, viewing the reaction to the latter as a therapeutic test of hyperthyroidism.

Obituary

Dr. J. W. Campbell, a well known physician of Kingston, died on October the 11th. He was a graduate of Queen's University in 1891, and was for many years on the staff of Queen's University.

Dr. C. J. Gross died suddenly at his home, 83 Park Ave., from heart disease. Dr. Gross was well-known in Montreal having been in practice in that city since his graduation from McGill University 12 years previously. He served overseas with the Canadian Army Medical Corps from 1917 until the end of the war. He was interested in many Jewish Welfare societies, and was connected with the Montreal Dispensary and other charitable institutions, and was one of the founders of the Montreal Jewish Orphans' Home.

Dr. Edgar Douglas, one of the best known physicians of Halifax, died very suddenly in the early morning of October 7th. Dr. Douglas graduated at McGill in 1904. He quickly established himself in practice, and won the esteem of his fellow practitioners. Very soon after the outbreak of the war, he went overseas where he made a fine record and won the Military Cross. After his return, he took a course in public health at McGill, and received the D.P.H. He was in charge of the Red Cross health caravan which toured a large part of Nova Scotia in 1920, and which attracted the attention of health authorities in many lands. Subsequently, he resumed practice in Halifax, and again enjoyed the confidence and support of a substantial clientele. His sudden death, while in the prime of life, came as a great shock to a large circle of friends and admirers. Less than twelve hours before his death he had been an interested spectator at a football match, and had rendered aid to a player who was injured. W. H. H.

XUM

Book Reviews

The Practice of Preventive Medicine. By J. G. Fitzgerald, M.D., F.R.S. Canada, Professor of Hygiene and Preventive Medicine, and Director Connaught Antitoxin Laboratories, University of Toronto; assisted by Peter Gillespie, M.Sc., C.E., M.E.I.C., Professor of Applied Mechanics, University of Toronto, and H. M. Lancaster, B.A.Sc., Director of Division of Laboratories, Provincial Board of Health, Ontario, and Demonstrator in Sanitary Chemistry, Department of Hygiene and Preventive Medicine, University of Toronto, and chapters by Andrew Hunter, M.A., M.B., F.R.C.S.; J. G. Cunningham, B.A., M.B., D.P.H.; and R. M. Hutton, with appendix articles by various contributors. Octavo 712 pp. with app. and index, 826 pages in all. St. Louis, C. B. Mosby Company, 1922.

This is a well printed, well illustrated and a clearly and concisely written volume eminently practical in its details, one of which the profession in Canada may well be proud. Edited by Prof. Fitzgerald, a laboratory man of high standing who has associated with him other members of the teaching staff in the University of Toronto, it presents the modern views in preventive medicine and public health as taught and practised in Ontario and we may add throughout Canada. In his introduction the Editor emphasizes the necessity for the practising physician of the present day to aim at more than the cure of the sick, important as that is; his endeavours should be also directed to the maintenance of health in all those entrusted to his care, and to the furtherance of all sanitary measures in his neighbourhood and county. He looks forward to the time when the State should provide a service for those to whom the cost of complete family health supervision is prohibitive. Such a service should be free to all, rich and poor alike, and no stigma of charity should be attached to its acceptance. This service should include provision for antenatal supervision, home visitation and infant welfare centres to safeguard the health of infants and little children, medical and dental supervision in schools and colleges, and clinics for the periodic medical examination of adults; in short a service which will have as its first aim the promotion of health and the prevention of disease. With it may be linked a system of hospitals, etc. for curative medicine. In all measures, however, prevention should be the keynote. Unfortunately mere nationalization of such a service does not of itself ensure perfection. In such a service three parties are concerned, officers in charge of administrative details; physicians who would be responsible for the work itself, and the general public. As Sir George Newman in a late report states, the individual citizen must be educated to recognize his responsibilities, and if he is to reap his full advantage he must at the same time act loyally as a member of the community.

The preventable causes of death in a community reach a high percentage; nearly 50% of the total number recorded in the registration area of the United States for the year 1909 are classed as such. This high percentage can, and undoubtedly will be greatly reduced when precautionary measures now recognized as effective are carried out in every community.

Fitzgerald groups the large majority of the preventible diseases under the following heads.

Those in which the etiological agents are transferred from the sick to the well in the secretions of the mouth, nose and throat.

Those which are transmitted in water or food contaminated by excretions from the intestinal or urinary tracts of the sick.

Those in which the infecting organisms are transferred from the sick by means of the bite of some species of insect.

Those in which infection occurs through actual contact as in venereal disease and a small group in which the infecting organism appears to live, some stage of its existence in the soil, though their habitat is really the intestinal tract of lower animals.

The control of these communicable and preventible diseases is discussed from the standpoints of their incidence, etiology, modes of transmission and methods for the prevention of the transference of the infecting agents from those infected. This occupies the first twelve chapters, the smaller half of the volume.

In the following chapters Mr. H. M. Lancaster, now Director of the Federal Laboratory for the Examination of Foods and Drugs, discusses the various possible impurities in water, methods for their recognition, and the most approved means for water purification. This chapter is well written and fairly well illustrated, and is one of the most important in the book. Second only in importance to water is the milk supply of towns and cities. For the young it is all important that it should be obtainable fresh, clean, and free from all pathogenic bacteria, with its nutrient properties in no way destroyed. The whole subject is well and thoroughly treated and includes the hygiene of the stable and the handling of the milk from the time it leaves the udder till it reaches the consumer. A copy of regulations enacted by the Department of Health for its distribution and sale is appended. Food adulteration, poisonous foods, methods for preservation of food and food poisoning are discussed in another chapter. Dr. Andrew Hunter, in an interesting chapter discusses the food requirements of man, diet defects and deficiency diseases. Mr. Peter Gillespie contributes a very excellent chapter on domestic and community sanitation which is well illustrated. Maternal and infant mortality, school hygiene, public and health centres, and industrial hygiene, all occupy separate chapters and are fully discussed. The last 100 pages of the work are devoted to various appendices which are a useful addition to the book. Typographical errors do occur; and in some chapters the selection of the tables and illustrations might be improved. Such defects are incidental to almost all first editions. We hope a second edition will shortly be necessary. We append an excerpt from an English review of the work.

"Dr. J. G. Fitzgerald, professor of hygiene and preventive medicine in the University of Toronto, has written *An Introduction to the Practice of Preventive Medicine* with the object of outlining "some of the work of the physician who is to function on the preventive as well as the curative side of medicine." Although at the outset the practitioner may be alarmed at the sight of a volume of 800-odd pages which only outlines the subject with which it deals, he will not need to read very far before discovering that the author is an original thinker who is able to place facts and conclusions before his readers in an attractive and helpful manner. He looks forward to a time when everyone in the community will feel that an actual stigma attaches to one who has a preventible physical or mental disability and when the physician will be engaged to keep his patient well by routine examination, by supervision and advice. Nearly one-third of the volume is concerned with transmissible diseases, each being dealt with separately as regards its etiology, incidence, mode of transmission, and methods of control. With respect to the last, much sensible advice is given. A very informing chapter on milk is contributed by Mr. H. M. Lancaster, and con-

tains the text of the Canadian regulations with respect to the production and distribution of milk. A very well arranged index adds to the value of a work which is essentially one of reference, and the large number of excellent illustrations are helpful in elucidating the text.—*British Medical Journal*, Aug. 4, 1923."

The Study of Anatomy. Written for second year medical students. By S. E. Whitnall, M.A., M.D. Renouf Publishing Co., McGill College Ave., Monteat, 1923. Price 50 cents.

No movement in modern British medicine is more welcome than that led by some of our younger anatomists who have caught the spirit of Sir Charles Bell and returned to the teaching of living, functional anatomy. A member of this group is Dr. S. E. Whitnall, who until he was called from Oxford to succeed Sir Auckland Geddes in the chair of anatomy at McGill University was known to his British colleagues for his researches into the anatomy of the eye and orbit, and more especially for his gift of covering a great seriousness of purpose by a happy sense of wit and humour. At Oxford he became imbued with the learned humanity which animated one of his teachers —Sir William Osler—and this spirit he has carried back to Sir William's Dominion and allowed it to bubble freely over into a little book which he has entitled *The Study of Anatomy*, intending it for his own students. It deserves a much wider circle; we hope it may spread into every medical school where the English tongue is spoken, for it contains happily expressed precepts which young and old will find helpful and stimulating. The essential lesson Professor Whitnall wishes to press home to medical students is that, on entering the dissecting room, they must keep their imaginations as sharp and lively as their scalpels, and on entering hospital wards they must keep the same faculty equally alert when they palpate, percuss, or auscultate, if they are to reach the source of illness. The beginner, he says, who looks on the skin of his "part" as merely something which has to be removed is wasting his opportunities unless he also remembers that it is a living sentient organ endowed with functions which are essential to health and life. The student who has displayed all the structures of his part and has failed to breathe his imagination on them, so as to make them live and move, is in the position of a man who has cut the leaves of a book and thrown it away unread. Our author would have medical students and medical men, as each manifestation of structure or of disease meets their attention, ask themselves a perpetual "Why?" and never rest until they find a reasonable answer or explanation. He would have his students, as they examine sections under the microscope, to remember that what they see are artificial snapshots of the living units which carry on the work of the body. Above all, he would have medical students, in these days of crowded curricula, cultivate a sense of perspective, and discriminate between the important and the unimportant. The tradition which has clung to our British chairs of anatomy—that their occupants should be men of wide interests—finds a true representative in Professor Whitnall. In this booklet he places at his pupils' disposal a rich experience gleaned from a close study of how men should order their careers if they would take the best out of life.—*Brit. Med. Journal*, Sept. 29, 1923.

Tubercle Bacillus Infection and Tuberculosis in Man and Animals. — By Albert Calmette, Associate Director, Pasteur Institute, Paris. Translation of the second French edition by Willard B. Soper, M.D., Saranac Lake, N.Y., and George H. Smith, Ph.D., Yale Medical School. Largo 8vo. of 714 pages, 31 figures, 25 colored plates. Williams and Wilkins, Baltimore, 1923. Price $8.00.

A great and authoritative work by a master mind to which full justice has been done by the translators and the publishers. No work of such great importance dealing with tuberculosis has appeared in recent years. It is a complete and explicit presentation of the facts and problems of tuberculosis as known to-day. Though the facts are drawn from all available sources, Calmette's own extensive researches into the etiology of tuberculosis, and the processes of infection and resistance form the basis of the work. Calmette to-day is the outstanding worker in this field, and the English reader owes a great debt of gratitude to the translators and publishers for their painstaking labours in making this study available. It is a summary of our present scientific knowledge with the studies and ripe experience of a brilliant scientist.

Our conception of the disease tuberculosis has changed materially in recent years. Here we are given a picture of the processes of infection and resistance, of re-infection and spread within the body. We cannot attempt to give a summary of the immense amount of material here placed before us in an orderly fashion. No one interested in tuberculosis, whether physician, pathologist, laboratory worker or veterinarian, can afford to ignore this notable work. It can be read and re-read and be at all times a work of reference. Some forty-four chapters cover the main subjects presented. These are divided into four main divisions, (1) The tubercle bacillus and processes of infection by it, (2) Experimental tuberculosis and tubercle bacillus infection in animals, (3) Processes of defence and the diagnosis of tuberculous infection, (4) Natural immunity and processes of immunization against tuberculous infection. The closing chapter entitled "Scientific Principles which should serve as a basis for prophylaxis against tuberculosis" should be read and mastered by every physician, laboratory worker and public health official who has to deal with tuberculosis. It covers in a small space the facts and conclusions upon which to base our present efforts to combat tuberculosis. J. H. E.

The Mortality Experience of Industrial Policy Holders 1916-1920. Large 8vo. of 150 pages with 114 tables. A contribution to the Public Health Movement in America by a number of insurance companies. Presented with compliments of Industrial Life Insurance Company of America. New York, 1923.

This statistical study is the report of a committee organized to undertake a collective study of the mortality tables and records of six large industrial insurance companies over a period of five years. The initiative lay with that indefatigable worker Frederick L. Hoffman, and the report is over the signature of Louis I. Dublin. The result is a valuable contribution to the Public Health Movement in America. The companies whose records have been collected are the Colonial Life of America, The John Hancock Mutual, The Life Insurance Company of Virginia, The Metropolitan Life and the Prudential. A limited number of the reports are available for distribution to those interested.

The policy holders include men, women and children of all ages and races. These companies in 1920 had 26,000,000 policy holders in their industrial department, over one-fifth, nearly one-fourth, of the entire population of the United States and Canada, and this would make it appear that almost three of every four men, women and children over one year of age among the wage earning population of the cities are included in the study. There is an added value in these tables

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over those issued by our health departments in that the reported deaths are investigated by the companies, ensuring a greater accuracy in the certified cause of deaths. In all the tables there is a comparison of the death rate in the industrial policy holders with that of the general population in the coresponding age groups. The age groups cover five-year periods from one to twenty-four years, and ten-year periods from twenty-five to seventy-four years.

From 1916 to 1920 the death rate from tuberculosis has dropped from 170 per 100,000 to 125 in the industrial policy holders, while in the general population in the same period it has fallen from 141 to 112.5.

Influenza and pneumonia covering the period of the great epidemics of 1918 and 1919 receive full attention. Organic heart disease was the third in numerical importance among the causes of death and was an important cause of death at all ages. Even in the age period one to fifteen years it caused more deaths than did measles or whooping cough. Bright's disease ranked fifth in numerical importance as a cause of death, and its rate during the five-year period showed a distinct downward trend. The decline was greater in the insured group than in the general population. Accidents ranked sixth, causing more deaths in the industrial group than did cancer, the seventh in importance, and many more than cerebral haemorrhage which ranked eighth. The accident fatality was rather less than half of that of tuberculosis and rather more than half of that of pneumonia. Accidents are particularly important as a cause of death in old age and early childhood. At ages five to nine the deaths from accident about equalled those from diphtheria and caused one-sixth of the total mortality.

Cancer and other malignant tumours form the seventh cause of death in numerical importance. There is no indication in the five-year period under study, of either increase or decrease in the death rate from cancer in the industrial figures or in the general population.

The studies of the rates in the various infectious diseases, arterial disease, and the puerperal state, offer much suggestive material for the public health worker. The report is presented in somewhat contracted form. The Committee have much more material available on their fyles and promise further analyses if the present report is favourably received. It is to be hoped that the Committee will receive sufficient encouragement to continue these valuable studies.

J. H. E.

Les Colites—By Prof. P. Carnot, Faculty of Medicine, Paris, P. Harvier, R. Friedel and Lardennois. 8vo. of 224 pages ,with 34 figures. Paris, 1923, Libraire J. B. Baillière et fils. Price 10 francs.

This is the second of a series of small volumes appearing under the group title of **Consultations sur les maladies de l'estomac et de l'intestin** under the editorship of Prof. Paul Carnot, and comprising a course of gastro-enterology given in his service at L'Hospital Beaujon. There is a summary of the principal symptoms of colitis, which are grouped on an etiological basis, the parasitic, the infectious, the toxic, and the mechanical, including stasis. The functions of the colon are outlined in a chapter which deals with the most recent physiological researches. This is followed by a study of functional changes, those due to hyper-peristalsis and hypo-peristalsis, spasm and stenosis, and those due to faulty obsorption and secretion. The chemical and microscopical study of the faeces are detailed in such a way as to shed much light upon the diagnosis.

The chapter on amoebic and other parasitic forms of colitis is a very interesting one as is that on the bacterial forms, though the section dealing with tuberculosis is scant and insufficient. Under the toxic forms, Harvier writes specifically of the uraemic form, the mercurial and the gouty. Friedel writes the chapter on recto-sigmoiditis, dysenteric, tuberculous, syphilitic, gonorrheal and other forms whose causative agent is unrecognized.

Lardennois discusses the surgical complications, the malformations of the colon, the ectases and retention. The whole work is well written and gives a succinct summary of the more important points relating to the causation, the diagnosis and the treatment of colitis in its various forms.

J. H. E.

Collected Papers of the Mayo Clinic. Vol. 14, 1922. Edited by Mrs. M. H. Mellish. 8vo., 1394 pages, 488 illustrations. Philadelphia, W. B. Saunders Company, 1923. Cloth $13.00. Canadian Agents, The J. F. Hartz Company Limited.

This volume requires no introduction to the medical profession. As the title indicates it is a collection of the 1922 papers and addresses prepared by the staff of the Mayo Clinic of Rochester and of the Mayo Foundation of the Graduate Medical School of the University of Minnesota. All have appeared in various journals and society transactions, but are here published in convenient form for reference. The volume gives a picture of the multitudinous activities of the clinic. There are some eighty-seven contributors and the subjects cover a wide range in medicine and surgery. The contents are conveniently arranged under the major headings of the alimentary tract, urogenital organs, ductless glands, blood and circulatory organs, skin and syphilis, head, trunk and extremities, nervous system, chemistry, technique and general.

Many of the papers have an extensive bibliography and there is a bibliographical index. The illustrations are a valuable feature of the volume.

The general practitioner as well as the specialist will enjoy the work. Whether reading a case report, the record of a research, a study of a series of cases, a summary of our present knowledge of a subject, or a text-book chapter upon one or a group of diseases. The work reflects great credit upon the clinic and upon the editor.

J. H. E.

Recovery Record—for use in tuberculosis, by Gerald B. Webb, M. D., Colorado Springs, Senior Consultant in Tuberculosis, A.E.F. President, Colorado School of Tuberculosis, and Charles T. Ryder, M.D. 12 mo. cloth, 195 pages with 108 charts. New York, Paul B. Hoeber, 1923. Price $2.00

This book is the outcome of a happy thought to combine a work of instruction, help and cheer with the patient's records of progress, or rather to combine with the patient's notes and observations, kept for the physician's comments and instructions a useful guide to how to get well. The patient will always have on hand (or in his pocket) a book of helps and hints which tells him the why and the wherefore of the plan of treatment.

The chart pages which are arranged for two years' record carry a cheery, helpful message for the patient. The authors have culled the literature both ancient and modern, medical and lay, to find proverbs and quotations, prose and verse which will carry an optimistic and happy thought to the patient. There is a place for such a book in the present day systematic treatment of tuberculosis, which is usually so prolonged that patient and physician will welcome any addition to the little things that help. To-day the quoted words of Louis are still true, though written nearly a century ago "As our knowledge of the disease becomes more perfect, the mind feels relieved and the horizon widens."

J. H. E.

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Practical Dietetics with reference to diet in health and disease. By Alida Frances Pattee. 12 mo., 687 pages, fourteenth edition. A. F. Pattee, Mount Vernon, N.Y., 1923. Price $2.60.

That this work is now in its fourteenth edition and that nearly 240,000 copies have been sold tells the story of its popularity. It has been generally adopted in the leading hospital training schools and in many of the schools teaching domestic science. The author has been assisted in the theoretical part of the work by professors in leading schools of Household Arts, while the chapters on diet in disease have been arranged under the supervision of outstanding physicians. Acknowledgment is made of the assistance of such men as Joslin, Holt, Einhorn, Janeway, Allen and others. The work is eminently practical, such a one as should be in the hands of every nurse, while the physician will also find it of great service in detailing special diets in disease. The surgeon will find much that is helpful in arranging post operative diets in various conditions . The various diets for nephritis are given in full as are those in gastric ulcer. With such a book as a guide the physician should be able to secure the full co-operation of the nurse in any special case.

Accompanying the book is a volume of 142 pages giving the requirements of the various state boards in dietetics and a selection of recent state examination papers. J. H. E.

Diseases of the Ear, Nose and Throat, Medical and Surgical—by Wendell Christopher Phillips, M.D. Sixth revised edition. Illustrated with 578 halftone and other text engravings, many of them original, including 37 full page plates, some in colours. F. A. Davis Company, Publishers, 1922.

This is the sixth edition of this book which in itself is sufficient to show that it has met with very favourable response from the profession generally. The first section which takes up 103 pages has to do largely with the methods of examination, hearing tests, general diagnosis and general therapy of the ear. The book is large enough that it can well afford to devote so much space to this subject. It is one of the best features of the book. There appears to have been an endeavour throughout the book to combine a close connection between general medicine and oto-laryngology. It appears to have been the author's chief desire to thoroughly Americanize this volume, and to give preference to the achievements of Americans. In this, the author has succeeded, for it is a very complete presentation of American practice. This book will be found to be very useful for the general practitioner and the specialist, but from the undergraduate's standpoint, it is much too large. P. G.

Cancer. A Practical Quarterly Journal devoted to the best interests of Cancer. Volume 1, No. 1. Edited by L. Duncan Bulkeley and collaborators. Published by F. A. Davis Co., Philadelphia.

In presenting this new Journal to the profession the editor states that it is the aim and purpose of this publication to bring together in convenient form all advances in our knowledge which may assist the physician to a better knowledge of the medical treatment of this disease. The editor refers to the fact that there is already published in America a journal devoted to cancer research, but states that it has not thus far contributed much to the practical side of cancer, and does not materially aid the practitioner in prescribing the best methods of handling cases of this dire disease. In support of this optimistic effort we notice articles on "Immunity of certain groups of individuals to cancer," and "Nature and cancer," on "Cancer, a curable nutritional disease," on "The systemic treatment of cancer." It also gives the details of six cases of cancer in which the condition was regarded as hopeless and inoperable by surgeons, but in whom under carefully arranged dietetic, hygienic, and medicinal measures, and a local douche, *mirabile dictu*, rapid improvement took place and finally a complete cure. The last fifteen pages of the journal are occupied by a review of recent literature.

Institutional Household Administration.—By Lydia Southard, B.A., Instructor in Institution Administration, Teachers' College, Columbia University. Cloth, Crown 8vo. 214 pp., 91 illustrations. J. B. Lippincott Company, Philadelphia, London, and 201 Unity Building, Montreal, 1923. Price $2.00.

The publishers have projected a series of manuals dealing with institutional administration. This is the first of the series and deals more particularly with the general administration of living quarters including housekeeping. Much of the matter contained will be of value to the housekeeper of a home as well.

The books suggests that it has been prepared for class use, for the teacher rather than the housekeeper of an institution—it appears to be a class room text book rather than a practical manual. It covers a wide field and has many ureful suggestions brought together from numerous sources. There is a bibliography appended to each chapter. In addition to a discussion of broad principles there is much detail—for example a chapter on removal of stains, and one on household pests. Floor coverings receive full attention as do curtains, upholstery and furniture. The author has no decided opinions as to the best way to treat and preserve hardwood floors, this might be remedied in a future edition. J. H. E.

A Text-book of Therapeutics, including the Essentials of Pharmacology and Materia Medica. By A. A. Stevens, M.D., Professor of Applied Therapeutics, University of Pennsylvania, Philadelphia. 6th. ed., entirely reset. Cloth $6.25 8vo. p. 793. Philadelphia and London. W. B. Saunders Co., 1923.

This well known text-book must still find favour with the practitioner as a sixth edition has been found necessary. The reviewer, however, greatly doubts its value. The first 517 pages consist of a summary of the pharmacology and materia medica, the following thirty-six pages deal with "Remedial measures other than drugs" and only 183 pages are devoted to "Applied therapeutics." The pharmacology of the drugs is better described in several of the text-books on the subject. The materia medica is often inadequate to guide the prescriber in writing a prescription. For example, there is no indication that the solution of the perchloride of iron is acid or Fowler's Solution alkaline. Nor is there any indication of the alcoholic strength of the tinctures. The authority for doses and names is the U.S.P., which lessens its value for Canadians. The author also finds it still necessary to include all pharmacopoeial drugs and many that even the pharmacopoeia no longer admits, their lack of value having been abundantly proven. In consequence, the sections on therapeutics are not reasoned expositions of the pathology and consequent therapeutics but brief compilations of traditional treatment, save in exceptional paragraphs. V. E. H.

The Therapeutic use of Digitalis, G. Canby Robinson, Professor of Medicine, Vanderbilt University. (being Vol. 1, Medicine Monographs). 144 p., 6 x 9. $2.50. Williams and Wilkins, Baltimore.

This excellent book should be read by every practitioner, as it sets forth clearly and definitely the use of digitalis, which is undoubtedly one of our most im-

ASSOCIATED ORGANOTHERAPY BY MEANS OF KERATINIZED CAPSULES OF

PANGLANDINE

Panglandine.

In organotherapy, Panglandine represents the materialisation of Professor Lancereaux's view which recent discoveries have amply confirmed and extended, carried out by COUTURIEUX since 1897 and constantly improved upon since that date by turning to account all the more recent additions to our knowledge in this department of therapeutics.

Organotherapy is indeed the only trustworthy method of treatment in all affections due to functional disturbances of the endocrine glands and physiologists have demonstrated that the only useful organotherapeutical preparations are those containing the entire dried gland, that the dose thereof should be extremely small in order to obviate too pronounced a stimulating action and they point to the necessity of including the different glands in one and the same treatment and, finally, that the product should be taken in such a form as to ensure its proper preservation and rapid assimilation.

It was with these data in view that the formula of Panglandine was established as follows:

Thymus	0.024	Thyroid	0.004
Ovary	0.000.3	Pancreas	0.004.8
Spleen	0.012	Testicular secretion	0.042
Duodenum	0.003.3	Liver	0.090
Pituitary body	0.004	Prostate	0.014
Suprarenal	0.001.6		

in each keratinized tablet

It will be seen that the proportions of the various glands in no wise correspond to their weight in the human body. This was because it appeared to us preferable to calculate the physiological equivalence of the glands and to include them in our product in quantities proportional to their weight in the fresh state in the animal i.e. that to obtain a certain weight of Panglandine we make use of one thyroid gland, one thymus, two suprarenals and so on.

The Endocrinous Glands and their functions.

Here then we have a gland (the pancreas) which possesses at one and the same time an external and an internal secretion, this double function is also present in the liver, the duodeno-jejunal mucosa and the mammary gland; on the other hand every organ, every cell, pours into the blood products which modify its composition.

Are we on this account to look upon the cells as endocrinous organs? No, those only belong to this category of organs which elaborate either nutritive substances or substances having for object to regulate the exchanges, to maintain the internal milieu or to provide for the development of the individual; or functional stimulants (*Hormones*) which, for the most part, have not been isolated or chemically defined, the nature of which, however, is revealed by their physiological specificity.

The **nutritive matters** (glucose, fats, blood, albumen) are secreted by the liver, the pancreas and the intestinal mucosa.

Substances that regulate functions or chemical processes or control the nutritive exchanges, maintain the internal milieu and the normal development of the body, are elaborated by the pancreas (which regulates the production of sugar); the liver (antithrombin), the testicle, *corpus luteum*, the thyroid, the pituitary body and the thymus.

Lastly, **stimulating substances, or hormones,** are secreted by the spleen (activation of trypsin), the thyroid (increase of nitrogenous and respiratory exchanges), the duodeno-jejunal mucosa (secretin) and the suprarenal capsules (adrenalin).

To the highly important part played by these organs, as shown physiologically by the disturbances that follow changes in, or destruction of, any one of them, must be added the functional correlations that exist between these different glands. This enables us to take a general view of the probable consequences of functional shortcomings.

If the secretion be deficient or, on the contrary, in excess, whether it be modified in respect of its chemical nature—which seems to be mostly the case—we at once get pronounced disturbance of the organism as a whole in which most of the endocrinous glands share and the only effectual treatment whereof consists in introducing substitutive products.

How then can we institute effective organotherapy?

We must give the entire non-modified gland.

The **grafts** that physiologists have practised on animals after ablation of a gland would be the method of selection were it not that there are several difficulties in the way, viz: first of all a surgical operation that can only be performed by specialized practitioners, then too the grafts as a general rule only survive a short time after which they are either absorbed or encysted; lastly, the graft must be taken from the healthy gland of an individual belonging to the same species. It is plain that in respect of man this condition is virtually impossible to comply with.

Extracts obtained from glands taken from animals constitute a much more practical method, but all physiologists are aware of the extreme fragility of the active principles and know that however carefully handled they are very liable to destruction or transformation. To isolate the active principles of the endocrinous glands as is done for the alkaloids and glucosides of vegetables is assuredly a seductive theory but it is beyond our reach for the time being since, with the exception of secretin and adrenaline, the chemical nature of the other secretions is unknown.

Do we even know which is the secretory tissue, what layer of cells elaborates this or that product or whether the gland is not a laboratory where the different operations follow each other in an uninterrupted chain of reactions?

As long as these questions do not admit of an answer the practitioner's only resource is to administer the **entire gland,** rapidly dried at a low temperature immediately after its removal from the animal's body.

Only small doses are to be employed.

Organotherapy must moveover be based on this other capital datum, viz. endocrinous substances act in very minute doses "Morphogenetic substances and hormones are bodies that appear to behave as nervous stimulants or to have a diastasic action. They liberate preexisting energy...." (E. GLEY). In point of fact, when we inject a patient with adrenaline the substance administered is almost at once destroyed yet its influence on the blood pressure lasts for several hours, so it follows that the drug must have stimulated the normal secretion of the suprarenal glands.

Continuation of the treatment does not set up intolerance, on the contrary, moderate repeated stimulation brings about **restoration** of normal function. Yet it is easy to understand that too intense stimulation is likely to have the opposite effect by exhausting the gland with consequent aggravation of the disturbances. Lastly, large doses very rapidly give rise to toxic accidents too well known for it to be necessary to describe them here.

The necessity of administering glands of internal secretion in **small doses** is therefore solidly established on physiological and toxicological grounds.

Organotherapy must be polyglandular.

When an endocrinous gland is damaged the whole glandular system is affected (H. CLAUDE RENON). As a matter of fact there are correlations, substitutions and antagonisms between the various glands. The splenic blood accelerates pancreatic digestion, the pituitary body and the *corpus luteum* act on the secretion of milk, and the suprarenals have an analogous effect on the blood pressure. Pituitary body and thyroid exert a similar influence on the assimilation of lime, magnesia and phosphorous (FALTA, SCHIFF), etc... Lastly, we are aware of the antagonism between the pituitary body and the thyroid (treatment of Graves' disease); between the pancreas and the suprarenals (PEMBERTON et J. E. SWEET, 1908-1910). In short the whole glandular system may be likened to a complicated machine in which each organ exerts a regulating influence on one or several of the others.

The necessity for **associated organotherapy** is consequently quite plain in presence of deficient secretion or disturbed function. There remain the cases of excessive secretion. Can these be benefited by a mixture of glands with which the hypersecreting gland is associated? Shall we not aggravate the disturbance? A. LŒWY and P. F. RICHTER point to the fact that the testicle and the ovary increase respiratory exchanges **only** in castrated animals and not at all in entire animals from which we may infer the innocuousness of the treatment is small doses in healthy subjects. On the other hand hyperactivity of a gland is for the most part due to diminished activity on the part of its antagonistic glands. As only the latter will be stimulated every advantage and no drawback attends the administration to the patient of a preparation containing the totality of the glands.

To sum up. PANGLANDINE is at the present time the only preparation that enables us to institute organotherapeutic treatment in accordance with the most recent physiological data, that is to say, with the *entire gland, dried and preserved from contact with the air, in small doses, in association with the various other glands.*

The Indications for Panglandine.

FOR CHILDREN it is prescribed in cases of **myxœdema, delayed growth** (thyroid and pituitary insufficiency), **delayed puberty** (hypothyroidea.) **infantilism** (orchitic insufficiency), **in gigantism and acromegaly** (hypersecretion, pituitary hypersecretion) and in the treatment of **arrested** development (pituitary insufficiency).

IN ADULTS Panglandine is prescribed in **disturbances of the thyroid** function (obesity, gastro-intestinal disturbances, circulatory nervous disturbances, exophthalmic goitre), in **suprarenal disturbances** (Addison's disease, wasting, lowered blood pressure in infectious disease), **pituitary disturbances** (wasting or obesity, glycosuria), **ovarian troubles** of morbid or surgical origin.

Lastly, **PRECOCIOUS SENILITY** due to hypothyroidea and **arterial atheroma** (hypersuprarenalia) are similarly amenable to Panglandine.

Its action however, is highly beneficial in various morbid states characterized by symptoms that do not correspond with any particular affection such as certain forms of debility, rheumatism, obesity, myocardia, neurasthenia, arthritism, diabetes, wasting, anaemia and intestinal disturbances which are in reality the outcome of a pluriglandular syndrome which is not amenable to symptomatic medicinal treatment whereas Panglandine is productive of excellent results.

THE DOSES to be administered is **from 2 to 6 tablets daily** given between meals, taking the patient's age into consideration and beginning with small doses. In some instances, however, we must give as many as 8 to 10 tablets a day.

It is advisable only to give Panglandine for three weeks in each month in order to obviate the intolerance which would supervene in the long run were the stimulating influence of endocrinous glands maintained. With these precautions the treatment can be carried on as long as may be required without the slightest risk of any untoward occurrence.

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portant drugs. G. Canby Robinson is one of the best of the modern school of younger clinical men in the United States and has devoted much time and experimental work to the subject of this volume. His name is well known to all workers in this field. His judgment is sound and his advice to be relied upon. The scientific work is reviewed with great judgment and is properly appraised in the light of clinical experience. On all phases of the action of digitalis and its congeners, the practitioner will find the information he requires for an intelligent clinical use of the drug. Its toxic effects, its use in various types of cardiac failure and in fever, its modes of administration are all clearly set forth. The book is not only a credit to its author but also to the publisher and, if subsequent volumes are of equal value, they will be greatly appreciated. V. E. H.

International Clinics. Thirty-third series, volume ii., 1923. Edited by Henry W. Cattell, A.M., M.D., Philadelphia, with medical and surgical collaborators in United States, England and Canada. J. B. Lippincott Company, Unity Building, Montreal. Price $2.50 per volume, or $10.00 for the series of four.

In this volume over fifty pages are devoted to Insulin and its clinical administration, the remaining pages are divided between Medical Diagnosis and Treatment, and Surgery. Particularly suggestive articles for the general practitioner are those on the diseases due to protein sensitization and their treatment, pityriasis rosea, blood transfusion made easy, the Roentgen ray in diagnosis, chorea, rectal surgery under local anaesthesia, and problems in surgical diagnosis and treatment. There are, too, some excellent special articles on subjects such as electrocardiography, tularemia, the sequelae of epidemic encephalitis and tuberculosis of the kidney.

The editors continue their policy of presenting case reports of interesting conditions with excellent monographs on diseases which are met with frequently in practice. J. H. E.

The Practical Medicine Series. Vol. 1, General Medicine. General editor, Charles L. Mix, A.M., M.D. Small 8vo. of 678 pages with 61 full page illustrations and 35 figures in text. Chicago, The Year Book Publishers, 1923. Price $3.50 or the series of eight volumes $18.00.

This series places under review the principal contributions in medicine, surgery and the specialties. Eight volumes comprise the series which is available in set or in single volume. The volume before us deals with Infectious Diseases and Endocrinology, with George H. Weaver as editor; Diseases of the chest, by Lawrason Brown; Blood, Circulation and Kidney, by R. B. Preble; Digestive System and Metabolism, by B. W. Sippy and Ralph C. Brown. The names of the sub-editors vouch for the excellence of their respective departments. Each appears to have omitted none of the important papers which have appeared during 1922 and early 1923.

For the physician who would like to keep in touch with recent contributions to the science of medicine, this series will prove most helpful. J. H. E.

"Opening Doors", John Thomson, M.D., Edinburgh. (Oliver and Boyd.—1923).

This unpretentious little book with a very happy title comes from the pen of Dr. John Thomson. It is intended for the use of mothers of mentally defective children and sets forth in plain and simple manner, not only how a mother may know her child is not developing normally, but also what she may do to bring out what powers may lie dormant in the child.

The tone of the book is delicate and sympathetic. There is no word or statement that might offend a mother sensitive to the backwardness of her child. On the contrary she is encouraged by various means to assist nature in "opening the doors" of the child's mind. The author tells how even the most hopeless cases may be improved to a surprising degree, especially when training is begun early.

Medical practitioners and social workers will also find much to assist them in dealing with the difficult situation often presented by the presence of a defective child in a family. L. M. L.

Legal Medicine and Toxicology. By many specialists. Edited by Frederick Peterson, M.D., Manager Craig Colony for Epileptics; Walter S. Haines, M.D., late Professor of Chemistry, Materia Medica and Toxicology, Rush Medical College; and Ralph W. Webster, M.D., Assistant Professor of Medical Jurisprudence, Rush Medical College. 2nd. Ed. 8vo. 2 vol. p. 2268, 334 illustrations. Cloth $20.00. W. B. Saunders Co., Philadelphia and London, 1923.

This is an excellent book, exceptionally well written and well published; the cuts are very clear and well chosen. The contributors are all men of real experience and write with authority. A feature that will apeal to many physicians is the increased attention that is given to industrial intoxications, and the short but good chapter dealing with poisoning arising from the consumption of food infected with bacteria. The reviewer feels satisfied that this text book will be found to be a useful and satisfactory book of reference for any physician who cares to use it. V. E. H.

Applied Psychology for Nurses by Donald A. Laird. 229 pages, illustrated. Price $2.50. Published by J. B. Lippincott Company, 201 Unity Building, Montreal, 1923.

This is an ambitious volume and is well conceived, and the author has made an effort to cover this great subject, and yet make it highly practical. There is an unusually interesting chapter on temperaments that will be of value to the nurse that uses this book. One cannot but recommend this Applied Psychology to the nurse who is anxious to get a good knowledge of every type of work in psychology, and it enables one to understand the more usual terms that are used in the wards and the present day theories. At times the author is a little advanced in his views and statements; the volume is suitable for a nursing school but will bear revision. G. W. H.

A Text-book of Chemistry for Nurses, by Fredus N. Peters, A.M., Ph.D. 8½ x 5¼, p. 302, numerous illustrations in text. C. V. Mosby Company, St. Louis, 1923.

This well bound and printed little book is a credit to the publishers as to the author. The book differs greatly from the ordinary text-book of chemistry in that it introduces historical notes on the discovery of the elements described and the development of chemistry and contains much practical imformation about the uses of the chemicals described which is valuable to the nurses, though often not pertinent to a text-book of chemistry. V. E. H.

A Clinical Guide to Bedside Examination.—By Dr. H Elias, N. Jagic, and A. Luger, Vienna. Translated by Wm. A. Brams, M.D., Chicago. 8vo of 135 pages. New York, Rebman Company, no date.

A small manual for students covering observations to be made by inspection, palpation, percussion and auscultation. It contains too much to be considered as a suggestive outline and is too terse and crowded to be a readable text. J. H. E.

Eye, Ear, Nose and Throat Nursing—by A. Edward Davis, A.M., M.D., and Beaman Douglass, M.D. Second revised Edition. F. A. Davis Company, Publishers, 1920.

This is the second edition of what has been found to be a very useful manual on the nursing of ear, nose and throat affections. It is not in any sense a treatise on the disease, nor does it take the place of a text-book for the practitioner or student. Nevertheless, they will find a great deal of helpful information.

P. G.

Books Received

Principles of Bacteriology—By Arthur A. Eisenberg, A.B., M.D. 2nd edition. 214 pages, illustrated. Price $2.25. Published by C. V. Mosby Company, St. Louis, U. S. A.

Homoeopathy—A Live Explanation of what Homoeopathy is and what it means to your Health—By Fraser MacKenzie. Published by The Homoeopathic Publishing Company, 12A Warwick Lane, London.

Official History of the War—By Major-General Sir W. G. Macpherson, K.C.M.G., G.B., LL.D., Major-General Sir W. B. Leishman, K.C.M.G., C.B., F.R.S., LL.D., and Colonel S. L. Cummins, C.B., C.M.G., LL.D. 600 pages, illustrated. Price £1 1s Net. Published by His Majesty's Stationery Office, London, England. Medical Services Pathology.

Chemistry for Nurses—By Fredus N. Peters, A.M., Ph.D. 2nd edition. 302 pages, illustrated. Price $2.50. Published by C. V. Mosby Company, St. Louis, U. S. A.

Walter Reed and Yellow Fever—By Howard A. Kelly. Third Revised Edition. 352 pages, illustrated. Price $2.50. Published by The Norman Remington Company, Baltimore, Md., 1923.

Obstetrics for Nurses—By Charles B. Reed, M.D. Second Edition. 399 pages, illustrated. Price $3.50. Published by The C. V. Mosby Company, St. Louis, U. S. A.

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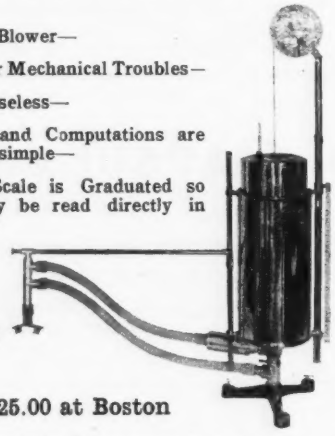

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